

**BETHLEHEM
TOOL
STEELS**

Property of Lillian Michelson

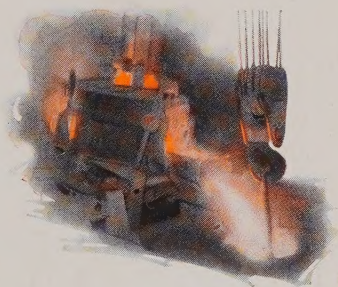


LM 00001529

Wayne Rising

20

BETHLEHEM TOOL STEELS

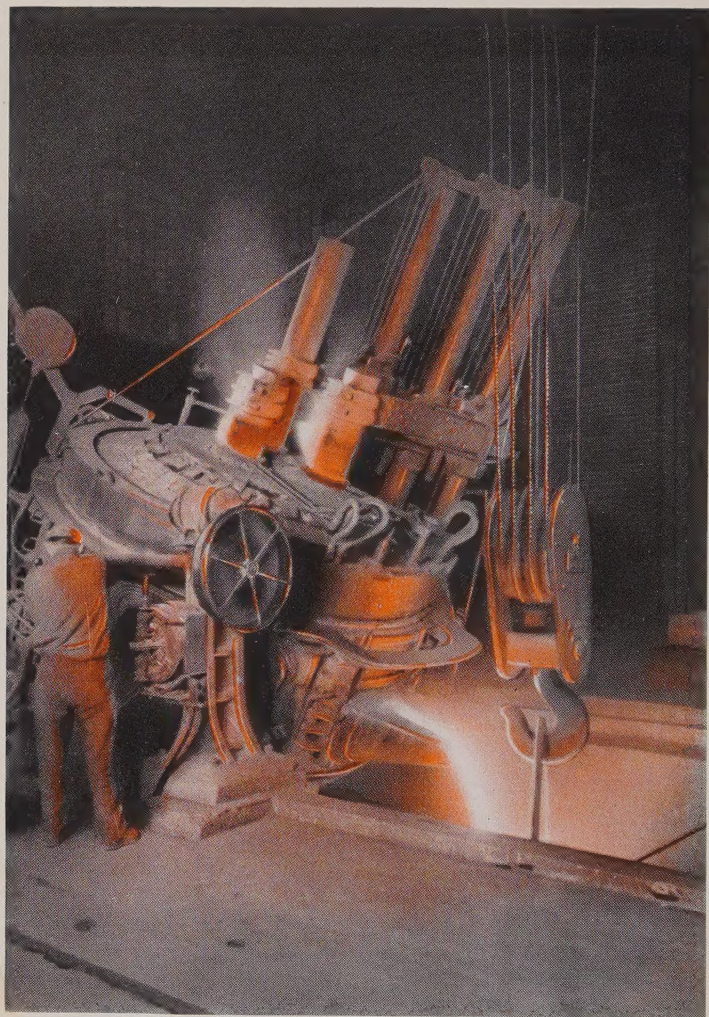


Catalog L-1

BETHLEHEM STEEL COMPANY

General Offices: BETHLEHEM, PA.

Tool Steel Department: BETHLEHEM PLANT
Bethlehem, Pa.



TAPPING A HEAT OF BETHLEHEM TOOL STEEL FROM A
SIX-TON ELECTRIC FURNACE

FOREWORD

High Speed Tool Steel, a result of Bethlehem Steel Company's research and experimentation, was developed and the process for its successful treatment, known as the Taylor-White process, perfected at the Bethlehem Plant of Bethlehem Steel Company. As long ago as the year 1900, Bethlehem Special High Speed Tool Steel was exhibited at the Paris Exposition, where a gold medal was awarded for the discovery of the process. Demonstrations at the Exposition proved that by the use of this steel the earning power of a then modern metal-cutting machine was increased over 100 per cent., thus revolutionizing machine shop practice.

Bethlehem has systematically continued research and experimentation in tool steels, and tools are now made from Bethlehem Special High Speed Tool Steels that show as great an improvement over those produced in 1900 as the 1900 tools showed over those previously used.

The importance of the Taylor-White process for the treatment of High Speed Tool Steel was again recognized at the recent Sesqui-Centennial Exposition at Philadelphia by the award of a gold medal to Bethlehem Steel Company for its tool steels.

The Bethlehem Tool Steel Plant is a separate unit, completely equipped and self-contained, devoted exclusively to the production of quality tool steels. The new laboratories for metallurgical control and experimental work aid greatly in promoting still higher standards of quality and uniformity.

The long experience of Bethlehem Steel Company in the manufacture of tool steels, combined with the extensive facilities for testing and checking their performance under varied conditions of service in the Company's plants, makes it possible for our experts to recommend the grade of steel best suited for a specific purpose.

*Facsimile of Gold
Medal awarded at
Sesqui-Centennial*



TABLE OF CONTENTS

SECTION	PAGE
I. Bethlehem Special High Speed Tool Steel.....	8
Bethlehem Extra Special High Speed Tool Steel.	15
Bethlehem Finishing Tool Steel.....	18
II. CARBON TOOL STEELS	
Bethlehem XXX Special Tool Steel.....	21
Bethlehem Superior Tool Steel.....	22
Bethlehem XX Tool Steel.....	23
Bethlehem XCL Tool Steel.....	24
Bethlehem X Tool Steel.....	25
III. ROCK AND MINING DRILL STEELS	
Bethlehem Superior Hollow Drill Steel.....	28
Bethlehem Mining, Quarrying and Stone Working Tool Steels.....	30
IV. ALLOY TOOL STEELS	
Bethlehem Tool Room Oil Hardening Tool Steel.	32
Bethlehem No. 71 Alloy Tool Steel.....	34
Bethlehem Tough Tool Steel.....	36
Bethlehem Lehigh Die and Tool Steel.....	37
V. SPECIAL ALLOY TOOL STEELS	
Nail Die Shapes.....	43
Bethlehem Chrome Ball Race Steels.....	43
Bethlehem No. 1 Permanent Magnet Steel.....	44
Bethlehem No. 2 Permanent Magnet Steel.....	44
Bethlehem No. 57 Hot Work Tool Steel.....	45
Bethlehem No. 445 Hot Work Tool Steel.....	47
Bethlehem No. 6 Nickel Steel.....	48

SECTION

PAGE

V. SPECIAL ALLOY TOOL STEELS (*Continued*)

Bethlehem Corrosion Resisting Steels.....	49
Bethlehem Stainless Steel—Type C.....	49
Bethlehem Stainless Steel—Type A.....	50
Bethlehem Corrosion Resisting Steels No. 2 and No. 3.....	50
Bethlehem Special High Chromium Steels....	51
Tool Steel Discs.....	54

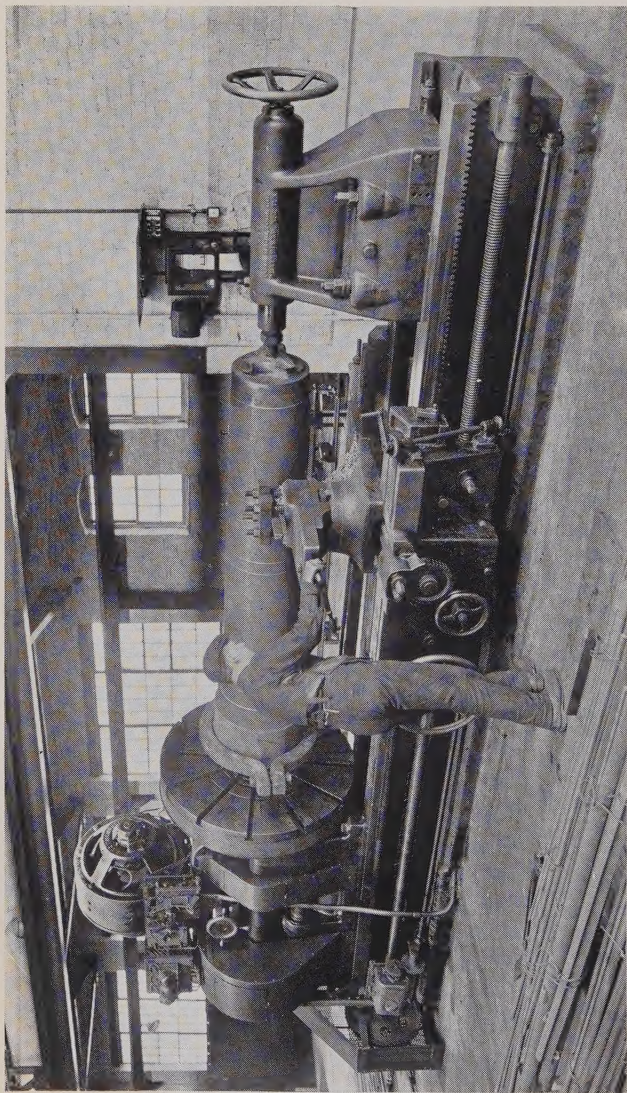
VI. Brand Names.....	57
Standard Classification of Extras.....	58
Instructions for Working.....	62

VII. TABLES AND USEFUL INFORMATION

Round Steel—Weight Per Linear Inch.....	66
Round Bar Steel—Weight Per Linear Foot.....	70
Square Bar Steel—Weight Per Linear Foot.....	72
Hexagon and Octagon Bar Steel—Weight Per Linear Foot.....	74
Flat Bar Steel—Weight Per Linear Foot.....	75
Table of Temper Colors of Carbon Steel Com- monly Accepted as Standard.....	95
Incandescent Colors and Temperatures—Taylor & White's Table.....	95
Temperatures—Conversion Tables.....	96
Table of Brinell Hardness Numbers.....	98
Number of Revolutions Required to Obtain Sur- face Speeds of From 20 Feet to 60 Feet Per Minute on Diameters From 1 Inch to 40 Inches.	100
Decimal Equivalents of Fractions of an Inch...	102

Index.....	103
------------	-----

District Offices and Warehouses.....	108
--------------------------------------	-----



THIS SPECIAL TESTING MACHINE IS USED TO CHECK UNIFORMITY OF BETHLEHEM CUTTING TOOL STEELS BY A STANDARD FEED AND DEPTH OF CUT ON A STANDARDIZED HEAT-TREATED STEEL FORGING.
A RECORDING WATTMETER IS USED TO MEASURE THE POWER CONSUMED

SECTION I

BETHLEHEM

SPECIAL HIGH SPEED TOOL STEEL
EXTRA SPECIAL HIGH SPEED TOOL STEEL
FINISHING TOOL STEEL

Extras for size and annealing, pages 60 and 61

BETHLEHEM SPECIAL HIGH SPEED TOOL STEEL



USES

Bethlehem Special High Speed Tool Steel is a high speed steel used for lathe, planer, boring, slotting, shaping and other roughing tools. It is also used for twist drills, milling cutters, taps, reamers, gear cutters, inserted saw teeth, inserted milling cutter teeth, special dies, wood-working tools, punches, dies and threading dies.

This steel is especially adapted for taking the heaviest cuts at the highest speeds, at the same time retaining the full efficiency of its cutting edge.

At its forging heat this steel can be readily formed into shapes necessary for making intricate tools.

Its properties are such that it can be easily annealed.

Bethlehem Special High Speed Tool Steel is noted for its remarkable uniformity in cutting qualities. This high degree of uniformity is assured by testing several tools made from bars forged from each heat, on a specially prepared forging of high carbon-high manganese steel. The feed and depth of cut used for each test have been established as those which enable the tool to develop the maximum efficiency.

State in detail the purpose for which the steel will be used

INSTRUCTIONS FOR WORKING BETHLEHEM SPECIAL HIGH SPEED TOOL STEEL

Preparing Tool Lengths

In cutting tool lengths from bars of Bethlehem Special High Speed Tool Steel, the bar should always be heated at the cutting point to a temperature of about 1750 to 1850 deg. Fahr. (a yellow color). Never cut this steel in a cold condition.

Forging

Heat the steel slowly and uniformly in a clean fire or furnace to a temperature of 1750 to 1850 deg. Fahr. (a yellow color), allowing sufficient time to permit the heat to penetrate to the center of the piece. While being forged the tool should be reheated when the temperature falls below 1750 deg. Fahr.

To relieve forging strains, which may occur in irregularly shaped tools, it is advisable to reheat the tool, after forging, to about 1550 deg. Fahr. (a light cherry red color) and bury in dry ashes or slaked lime and leave until cold.

After forging, the tool should be allowed to cool before proceeding with the hardening operation.

Hardening

Lathe, Planer, Slotter and all Types of Forged Roughing Tools that can be Ground to Shape After Hardening

Preheat the nose of the tool or its cutting portion slowly and uniformly to a temperature of about 1550 deg. Fahr. (a light cherry red color). Then as rapidly as possible bring up the furnace

temperature to 2200 to 2300 deg. Fahr. The nose of the tool should then be placed in a strong dry air blast and left there until cold, or quenched in an oil bath which is large

State in detail the purpose for which the steel will be used

enough to rapidly radiate the heat. Any reliable quenching oil will be satisfactory.

To remove the deteriorated metal, grind off at least one thirty-second of an inch ($\frac{1}{32}$ ") from each cutting surface of the tool.

Tools made from Bethlehem Special High Speed Tool Steel can be successfully heated in a forge fire, but more satisfactory and uniform results are obtained with a furnace designed for the purpose.

*Formed Milling Cutters,
Taps, Reamers, etc., and all
Types of Finishing Tools
that cannot be Ground to
Shape After Hardening*

Preheat the tool or its cutting portion slowly and uniformly to a temperature of about 1550 deg. Fahr. (a light cherry red color). Then raise the temperature as rapidly as possible up to about 2200 deg. Fahr. (a light yellow color), or until the surface of the tool appears glazed or oily. Quench in an oil bath which is large enough to radiate the heat rapidly, and draw the temper to 425-475 deg. Fahr., or to 1000-1125 deg. Fahr., depending upon conditions.

Tools may also be hardened by cooling under an air blast if there is no objection to the slight formation of scale on the surface.

Grinding

The high temperatures necessary to harden Bethlehem Special High Speed Tool Steel successfully have a tendency to slightly deteriorate the surface of the tool. Consequently, it is advisable that the deteriorated metal be ground off after hardening and before use.

As mentioned above, to remove the deteriorated metal, grind off at least one thirty-second of an inch ($\frac{1}{32}$ ") from each cutting surface of the tool.

State in detail the purpose for which the steel will be used

Grinding should be done on a free cutting emery wheel, under a copious, steady flow of water. The use of an intermittent flow of water, allowing the tool to heat up and then to come again in contact with water, will cause surface checks or cracks.

If the supply of water is irregular or not of sufficient quantity to keep the tool cool, it will be better to grind on a dry emery wheel, being careful not to heat the cutting edge of the tool.

Annealing

To anneal Bethlehem Special High Speed Tool Steel thoroughly, pack the tool with granulated charcoal in an iron box or pipe with about one-half an inch ($\frac{1}{2}$ ") of charcoal between the steel to be annealed and the walls of the pipe or box. Seal the pipe or box carefully and heat slowly and uniformly until heat has penetrated to the center and has reached a temperature of about 1500 to 1550 deg. Fahr. (a light cherry red color). Hold at this temperature for several hours, allowing the box to cool off slowly, preferably with the furnace. As an alternative method, the box or pipe may be removed from the furnace and buried in dry ashes or slaked lime and left until cold. The steel must not, under any circumstances, come in contact with air during the annealing process.

Caution: In annealing Bethlehem Special High Speed Tool Steel to make it dead soft, the surface of the bar is slightly decarbonized; this decarbonized metal will hereinafter be referred to as "bark." In the manufacture of tools which cannot be ground to shape after hardening, it is necessary to remove all of the bark from the cutting edges to be able to harden successfully. To obtain uniform surface hardness in the bar, remove at least one-sixteenth of an inch ($\frac{1}{16}$ ") from

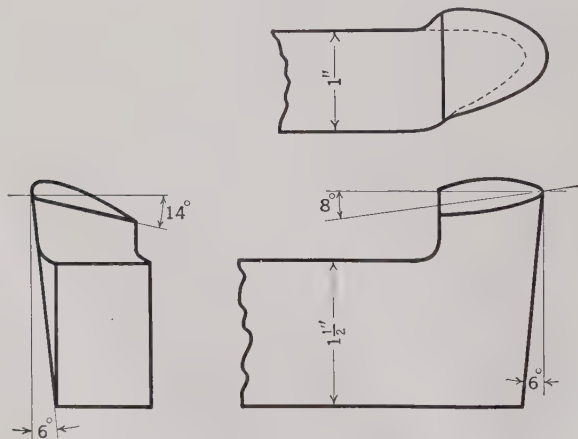
State in detail the purpose for which the steel will be used

the diameter of small sections and at least one-eighth of an inch ($\frac{1}{8}$ ") from the diameter of large sections. It is, therefore, necessary to order annealed tool steel large enough to allow for the removal of the bark.

ROUND NOSE TURNING TOOLS

We are frequently requested to recommend a design of round nose tool for rough turning. The illustration below shows the cutting contour and angles of a 1" x $1\frac{1}{2}$ " round nose roughing tool which will remove the maximum amount of material with least wear and tear on the machine and tool.

While it is not necessary to adhere to this design, it is strongly recommended that a standard of cutting contours and angles be adopted to suit the conditions under which the tool is to be used.



Side Rake of 14° is most generally used for medium hard steel but should be made 10° to 12° for harder material

Back Rake of 8° is constant for all material

State in detail the purpose for which the steel will be used

FOR MAXIMUM PRODUCTION

Bethlehem Special High Speed Tool Steel, made into uniform tools and given uniform heat treatment and careful grinding, assures maximum production.

Keep the tools sharp.

Do not run them to destruction before regrinding.

Do not blue or overheat the cutting edge in grinding.

Extras for size and annealing are given on pages 60 and 61.



BETHLEHEM SPECIAL HIGH SPEED TOOL STEEL PLANER TOOL IN OPERATION



A Variety of Tools Made of Bethlehem Steel, Also Special Tool Steel.

BETHLEHEM EXTRA SPECIAL HIGH SPEED TOOL STEEL



Bethlehem Extra Special High Speed Tool Steel is an exceptional and outstanding steel which has been developed in recent years especially for High Speed cutting service. It possesses remarkable properties which fit it for special classes of heavy duty work enabling machine tools to operate at speeds and feeds more nearly approaching their capacities.

Uniformity, ease in working and maximum production are the qualities which are rapidly establishing Bethlehem Extra Special High Speed Tool Steel as the standard in machine shops throughout the country where super-service is demanded and increased production justifies the use of a more expensive cutting steel than the standard Bethlehem Special High Speed Tool Steel.

USES

Bethlehem Extra Special High Speed Tool Steel is particularly well adapted for machining heat-treated alloy steels, brass, bronze or steel castings, extrusion dies and dummy blocks and for all other unusually heavy duty work.

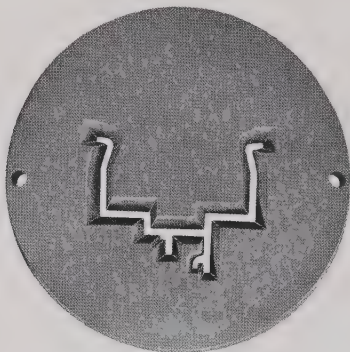
Hardening and Tempering

Bethlehem Extra Special High Speed Tool Steel responds to exactly the same treatment as Bethlehem Special High Speed Tool Steel with unusually uniform results.

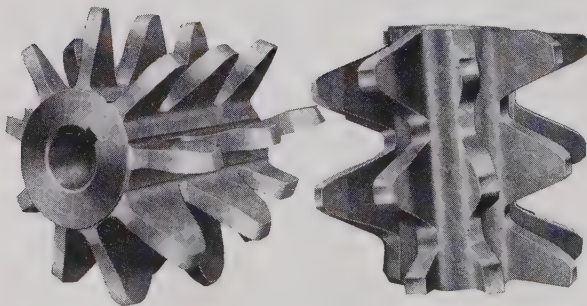
For heat treatment instructions see Page 9.

Extras for size and annealing are the same as for Bethlehem Special High Speed Tool Steel given on Pages 60 and 61.

State in detail the purpose for which the steel will be used



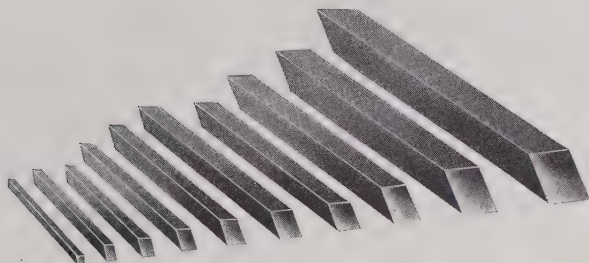
EXTRUSION DIE MADE OF BETHLEHEM EXTRA
SPECIAL HIGH SPEED TOOL STEEL



SPECIAL HIGH SPEED TOOL STEEL HOBS

Hobs made of Special High Speed Tool Steel for use in Cutting Teeth on Fire Engine Pump Gears made of Heat Treated Stainless Steel. At the time this photograph was taken these Hobs had been operating daily for eight months and were still in service.

BETHLEHEM HIGH SPEED STEEL BITS FOR TOOL HOLDERS



Bethlehem is prepared to furnish Bits for tool holders in either Bethlehem Special High Speed Tool Steel or Bethlehem Extra Special High Speed Tool Steel.

Every bit is hardened singly by an expert who is familiar with the heat treatment of Bethlehem High Speed Tool Steels.

The bits are packed in five pound boxes.

Grinding instructions for Bethlehem High Speed Steel Bits are the same as those given on page 10 for Bethlehem Special High Speed Tool Steel.

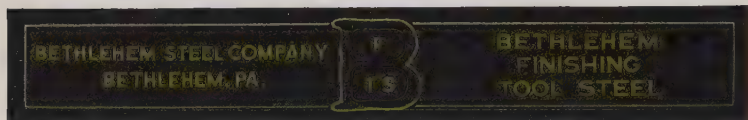
The following sizes and lengths are carried in stock with ends cut to an angle of 30 degrees:

$\frac{3}{16}$ " square x $2\frac{1}{2}$ "
 $\frac{1}{4}$ " square x $2\frac{1}{2}$ "
 $\frac{5}{16}$ " square x $2\frac{1}{2}$ "
 $\frac{3}{8}$ " square x 3"
 $\frac{7}{16}$ " square x $3\frac{1}{2}$ "

$\frac{1}{2}$ " square x 4"
 $\frac{9}{16}$ " square x 4"
 $\frac{5}{8}$ " square x $4\frac{1}{2}$ "
 $\frac{3}{4}$ " square x 5"
 $\frac{7}{8}$ " square x 6"

Special sizes and lengths are made to order.

When ordering in lengths other than standard, of either square or rectangular section, specify whether or not one or both ends are to be cut to our standard angle, or cut square.

BETHLEHEM FINISHING TOOL STEEL**USES**

Bethlehem Finishing Tool Steel is a very superior alloy water hardening tool steel which is strongly recommended for the following:

Chilled roll and brass turning tools; master tools and taps; milling cutters; reamers; cutters for finish reaming, boring and rifling guns; automatic screw machine forming tools; threading tools, chasers and dies; burnishing dies; cold drawing dies and mandrels for cold drawing high speed and carbon tool steels, brass, bronze, copper and steel tubing and bars.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1475 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper finishing tools to a temperature of about 420 to 430 deg. Fahr. (a very light yellow color).

For general instructions see page 62.

Extras for size and annealing are the same as for the Bethlehem Special High Speed Tool Steel given on pages 60 and 61.

State in detail the purpose for which the steel will be used

SECTION II

BETHLEHEM CARBON TOOL STEELS

XXX SPECIAL TOOL STEEL

SUPERIOR TOOL STEEL

XX TOOL STEEL

XCL TOOL STEEL

X TOOL STEEL

*For general instructions see page 62
Extras for size and annealing, pages 58 and 59*



TOOLS MADE OF BETHLEHEM CARBON TOOL STEELS

BETHLEHEM XXX SPECIAL TOOL STEEL**USES**

Bethlehem XXX Special Tool Steel is the very best grade of carbon finishing tool steel. It may be used for all purposes for which Bethlehem Finishing Tool Steel is recommended and will give equally good results if the cutting speeds are reduced to meet conditions. When machining the softer metals at the same cutting speeds, the only noticeable difference between the two steels is that Bethlehem Finishing Tool Steel will hold a keen, sharp cutting edge for a longer period and consequently will require less grinding.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1475 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper to suit conditions.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used

BETHLEHEM SUPERIOR TOOL STEEL**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.****BETHLEHEM
SUPERIOR
TOOL STEEL**

Bethlehem Superior Tool Steel is a carbon-vanadium tool steel, possessing all the characteristics of a straight carbon tool steel, as well as better physical properties, greater resistance to fatigue, and superior cutting qualities.

The beneficial results obtained by the addition of vanadium to simple carbon steels have long been recognized and proved both by tests in the laboratory and actual service.

USES

Bethlehem Superior Tool Steel is used in making taps and reamers, milling cutters, punches, stamping and blanking dies, broaches, blacksmiths' tools, boilermakers' tools, granite and mining drills and tools, wood-working tools, shear blades, chisels, rivet sets, drop forging dies, cold heading bolt and rivet dies, headers, trimming dies, and cold drawing dies and mandrels.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1500 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper to suit conditions.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used

BETHLEHEM XX TOOL STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

XX

TS

BETHLEHEM
XX TOOL STEEL

USES

Bethlehem XX Tool Steel is a general purpose tool steel of extra fine quality, possessing fine cutting ability. This steel is carried in stock in all tempers, suitable for the following: taps and reamers, milling cutters, punches, stamping and blanking dies, broaches, blacksmiths' tools, boilermakers' tools, granite and mining drills and tools, wood-working tools, shear blades, chisels, rivet sets, drop forging dies, cold heading bolt and rivet dies, threading dies, headers, trimming dies, and cold drawing dies.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1500 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper to suit conditions.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used

BETHLEHEM XCL TOOL STEEL**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.****XCL****TS****BETHLEHEM
XCL TOOL STEEL****USES**

Bethlehem XCL Tool Steel is recommended for all purposes requiring a uniform and reliable yet comparatively inexpensive grade of steel.

This steel is used for the following: collets, cups, cones, drop forging dies, trimming dies, mining and quarrying tools, blacksmiths' tools, fullers, flatters, cold cutters, track tools, boilermakers' tools, hand and pneumatic chisels, caulking and beading tools, rivet sets, punches and dies, shear blades, and machine parts that require hardening.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1500 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper to suit conditions.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used

BETHLEHEM X TOOL STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.



BETHLEHEM
X TOOL STEEL

Bethlehem X Tool Steel is the lowest priced grade of carbon tool steel manufactured by Bethlehem Steel Company. It is recommended for purposes where an inexpensive grade of tool steel is satisfactory for the service intended. This steel possesses strength and uniformity.

USES

Bethlehem X Tool Steel is used for quarrying tools, drills for soft rock, coal, etc. (for drilling hard rock, granite, etc., use Bethlehem XCL and Bethlehem Superior Grades). It is also recommended for furnace bars, pinch bars, crow bars, chisel bars, agricultural chisels and tools, and drift pins.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1500 deg. Fahr., depending on the shape and size of the tool to be hardened.

Quench in water.

Temper to suit conditions.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used



BETHLEHEM CHANNELLED STEEL USED IN QUARRY WORK



BETHLEHEM SUPERIOR HOLLOW DRILL STEEL USED IN THE
MINING OF IRON ORE

SECTION III

BETHLEHEM ROCK AND MINING DRILL STEELS

*Octagons, Hexagons, Quarter
Octagons, Rounds*

BETHLEHEM
SUPERIOR HOLLOW DRILL STEEL
XCL SOLID DRILL STEEL
X SOLID DRILL STEEL

*For general instructions, see page 62
Extras for size and annealing, pages 58 and 59*

BETHLEHEM SUPERIOR HOLLOW DRILL STEEL



Bethlehem Superior Hollow Drill Steel, like Bethlehem Superior Tool Steel, is a carbon-vanadium water-hardening steel. The presence of vanadium lengthens the life and reduces breakage of tools, resulting in greater production. Many laboratory tests, as well as field tests, made under the most drastic and diversified conditions, have proved that vanadium tool steel, made up in the form of Hollow Drill Steel, possesses fatigue-resisting qualities to a large degree. Bethlehem Superior Hollow Drill Steel, therefore, has the ability to withstand incessant vibration, with a minimum amount of breakage, particularly when used in the form of long drills.

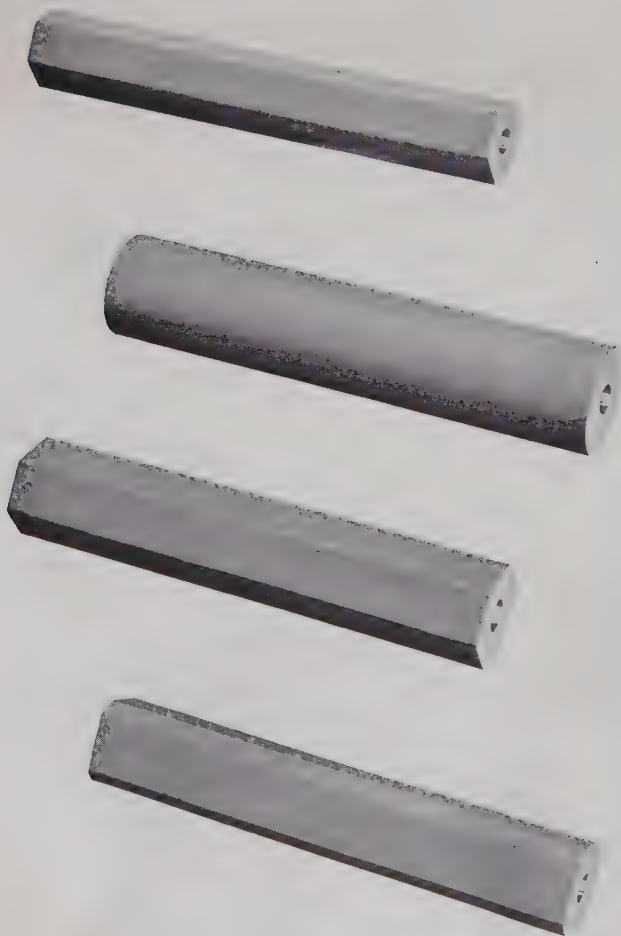
The forging, hardening and tempering temperatures are the same as those in the case of straight carbon tool steels for this purpose.

This steel is manufactured and carried in stock in Round, Hexagon and Quarter-Octagon sections.

EXTRAS FOR LENGTHS

Unless otherwise specified, random mill lengths will be furnished. If ordered cut to special lengths, an extra charge of 1 cent per pound will be made.

BETHLEHEM HOLLOW DRILL STEELS



BETHLEHEM MINING, QUARRYING AND STONE WORKING TOOL STEELS

SUPERIOR HOLLOW DRILL STEEL
CHANNELLER STEEL
LATHE AND PLANER STEEL
PICK STEEL
HAMMER STEEL
DOG STEEL
PIN STEEL
SAW STEEL

All of the above steels have been developed under actual operating conditions in the field, and we can, therefore, assure the user of excellent results, particularly with respect to cutting qualities and minimum amount of breakage due to constant vibration.

While carbon tool steels give excellent results for lathe, planer and milling tools in stone working service, the use of Bethlehem Special High Speed Tool Steel for these operations, under certain conditions, will increase production.

We will be glad to give you the benefit of our experience in the use of all these steels through the medium of our sales engineers and practical demonstrators.

SECTION IV

BETHLEHEM ALLOY TOOL STEELS

TOOL ROOM OIL HARDENING TOOL STEEL

NO. 71 ALLOY TOOL STEEL

TOUGH TOOL STEEL

LEHIGH DIE AND TOOL STEEL

For general instructions, see page 62

Extras for size and annealing, pages 58 and 59

BETHLEHEM TOOL ROOM OIL HARDENING TOOL STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

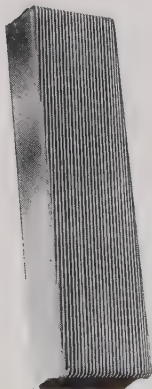
TR
TS

BETHLEHEM
TOOL ROOM
"OIL HARDENING"
TOOL STEEL

Bethlehem Tool Room Oil Hardening Tool Steel has been developed especially for use in the tool room in making master tools, dies, intricate pieces, and work of a similar nature.

NON-WARPING AND NON-SHRINKING

This steel is particularly adapted to the making of master tools, intricate pieces and similar work because of its remarkable non-warping and non-shrinking qualities. It has, in addition, the qualities of hardness and toughness, so that difficult tools can be made from it with freedom from distortion, with proper hardness for the work, and with toughness that will assure fine wearing ability.



THREAD
ROLLING DIE

HARDENS AND ANNEALS UNIFORMLY

Uniform results in heat treatment are desirable features in the use of Bethlehem Tool Room Oil Hardening Tool Steel. The steel will harden uniformly and anneal uniformly. The safety this gives in treating intricate tools can readily be appreciated.

USES

This steel is recommended for use in making punching, blanking, trimming, sub-press, forming and drawing dies; taps; reamers;

broaches; circular cutters; hobs; master tools of all kinds; plug, ring, thread, and service gauges of a variety of forms.

HARDENING

Preheat slowly to dark red, then heat gradually and uniformly to the proper hardening temperature (1400 to 1475 deg. Fahr., from a cherry red to a medium cherry color), depending upon the size and character of the tool.

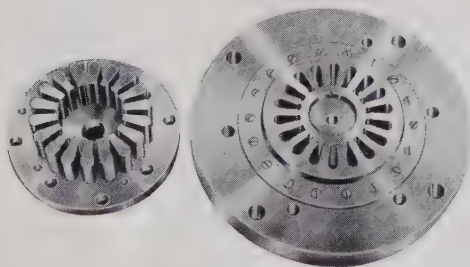
Quench in oil—fish, linseed or cotton seed oils preferred. Dip carefully.

TEMPERING

Always draw Tool Room Oil Hardening Tool Steel to at least 375 deg. Fahr., the point at which straw color begins to appear. Where extra toughness is required draw to a temperature of not over 450 deg. Fahr. (a medium straw color).

Extras for size and annealing, see pages 58 and 59.

For general instructions, see page 62.



DIE WITH PUNCH THAT FITS EACH OF THE EIGHTEEN POSITIONS OF THE DIE



BROACHES

BETHLEHEM NO. 71 ALLOY TOOL STEEL**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.****71****ATS****BETHLEHEM
NO. 71
ALLOY TOOL STEEL****USES**

Bethlehem No. 71 Alloy Tool Steel is an alloy steel recommended for hand and pneumatic chisels; for punches and shear blades used for cutting scrap, plates, sheets; and for set screws, machinery parts, etc.

The desirable physical and oil hardening properties of this steel, together with its wide tempering range, make it admirably suited for machinery parts which require hardening and which also must withstand stresses.

INSTRUCTIONS FOR WORKING**Forging**

Heat the steel uniformly in a clean fire or furnace to a temperature of 1650 to 1750 deg. Fahr. (a yellow color) and, after forging, allow to cool. While treatment may not always be necessary, it is recommended, in order to remove forging strains, that tools (particularly large and irregular shaped tools) be again heated to a temperature of about 1500 to 1650 deg. Fahr. and allow to cool slowly in air, or in air on an iron plate, or in a dry place.

Annealing

Heat the piece to a temperature of 1420 to 1450 deg. Fahr. and hold at that temperature for two to three hours, depending upon the size. The method of treatment given the piece after heating can be varied as follows: allow to cool

slowly with the furnace; or pack the piece with granulated charcoal in an iron box or pipe and seal carefully before heating, then allow to cool slowly, preferably with the furnace; or the pipe or box may be removed from the furnace and buried in ashes, lime or mica.

Hardening and Tempering

To harden, heat the piece to a temperature of 1575 to 1625 deg. Fahr. (1600 deg. Fahr. preferred).

Quench in oil.

Temper to a temperature of 450 to 550 deg. Fahr. or to a straw to a blue color, depending upon conditions.

This steel may also be hardened by quenching in water, but oil hardening is recommended. When water hardening is resorted to, heat to a temperature of 1475 to 1525 deg. Fahr. (1500 degrees preferred) or about 100 degrees lower than the oil hardening temperature. Tempering instructions are the same as those in the case of oil hardening.

Extras for sizes and annealing are given on pages 58 and 59.



A VIEW IN THE COLD DRAWING DIVISION OF THE BETHLEHEM
TOOL STEEL DEPARTMENT

BETHLEHEM TOUGH TOOL STEEL**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.****BETHLEHEM
TOUGH
TOOL STEEL****USES**

Bethlehem Tough Tool Steel is a chrome-vanadium steel possessing a remarkable degree of hardness and toughness. It is a water-hardening alloy steel recommended for use in making cold cutters, flogging chisels, rivet and button sets, hand and pneumatic chipping chisels, shear blades, punches and for similar tools requiring toughness and hardness.

Tough Tool Steel is especially well adapted for heavy cutting work due to its toughness (surpassing other grades of tool steel in this characteristic) and to its very close grain. Because of its great tensile strength, high elastic limit and great elongation it is also strongly recommended for machinery parts which require hardening.

HARDENING AND TEMPERING

The hardening temperatures range between 1400 and 1500 deg. Fahr., depending on the mass or section and hardness desired.

Quench in water.

This steel may also be made sufficiently hard for the purposes listed above by raising the hardening temperatures and quenching in oil.

To harden chisels, heat to a temperature of 1425 to 1450 deg. Fahr.

Quench in water.

Temper to a straw color or until a sharp file takes hold, bearing in mind that this steel, when tempered to a straw color, is of the same file hardness as a carbon tool steel chisel tempered to a blue color.

Hardening instructions for other purposes will be furnished upon request.

For general instructions see page 62.

Extras for size and annealing are given on pages 58 and 59.

BETHLEHEM LEHIGH DIE AND TOOL STEEL



Bethlehem Lehigh Die and Tool Steel is a high-carbon, high-chromium steel. This steel possesses unusual hardening qualities when hardened in oil and is especially well adapted for maximum production service. It also possesses non-warping and non-shrinking properties which make it particularly desirable for punch and die work where freedom from distortion is necessary.

USES

Lehigh Die and Tool Steel is used for all kinds of punch and die service, being especially well adapted for thread rolling dies, blanking dies for electrical sheets, shear blades and similar applications and for use where abrasion resistance is of prime importance.

INSTRUCTIONS FOR WORKING

Forging

Great care and attention must be given when heating and forging Lehigh Die and Tool Steel since it is more difficult to forge than ordinary Carbon Tool Steels. Where reforging is necessary heat slowly and uniformly to a temperature between 1750 and 1850 deg. Fahr., or a yellow color. Hold the tool in the furnace a sufficient length of time to insure the penetration of the forging heat to the center of the piece, which will be two or three times longer than in the case of heating Carbon Tool Steels. Do not forge below 1700 deg. Fahr.

Hardening

Heat small and intricate shaped tools to a temperature of about 1700 deg. Fahr., and larger tools to 1800 deg. Fahr. Quench in oil. As in the case of forging, the length of time required for heating in the furnace is two to three times longer than in the case of Carbon Tool Steels. Although the time required to heat the tool to the proper hardening temperature is considerably longer than in the case of Carbon Tool Steels, the tool should not be held at this temperature longer than is absolutely necessary because of danger of decarbonizing the surface of the tool. The cutting surface of the tool should be protected while heating, when possible, in order to avoid decarbonizing.

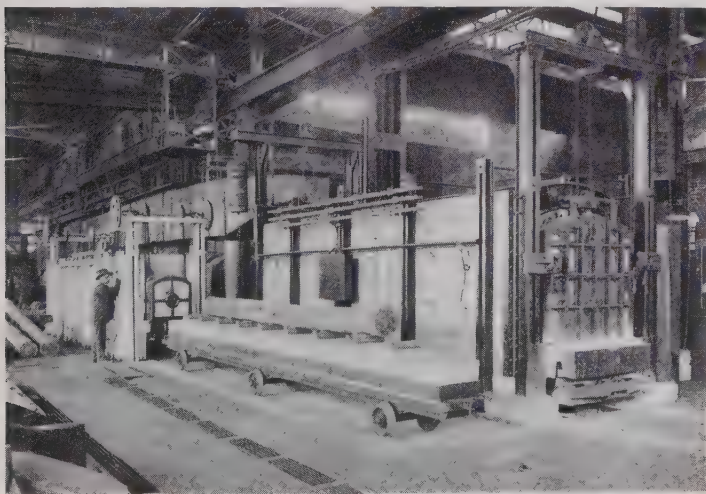
Tempering

Temper tools such as cold drawing dies, rolls, cold nut trimming dies, armature disc notching and punching dies, blanking and stamping dies and similar dies, to at least 400 to 500 deg. Fahr. All heavy duty tools or tools subjected to shock, such as thread rolling dies, drop forge trimmer dies, tools for shearing and punching spring steel and the like, temper to 950 to 1050 deg. Fahr. Tempering may be done in oil, salts, furnace or lead bath. Hold the tool at the draw-

ing temperature one-half to two hours depending upon size; the larger the mass, the longer it should be held at the drawing temperature. Tools should be tempered immediately after hardening and before they have become cold.

Annealing

To anneal Lehigh Die and Tool Steel, pack the tool with granulated charcoal, lime or some other suitable material in an iron box or pipe with about one-half inch of charcoal between the steel to be annealed and the wall of the box or pipe. Seal the box or pipe carefully and heat slowly and uniformly, until heat has penetrated to the center of the tool, to a temperature of about 1650 deg. Fahr. Hold at this temperature from six to eight hours, allowing the box to cool off slowly, preferably with the furnace; if desired the pipe or box may be removed from the furnace and buried in dry ashes or lime until cold, bearing in mind that the more slowly the steel is cooled the softer it will become.



ELECTRIC ANNEALING FURNACES



THE NEW—

TWO VIEWS OF THE BETHLEHEM TOOL STEEL METALLURGICAL
CONTROL AND EXPERIMENTAL LABORATORIES

THE OLD—

EXPERIMENTAL
EQUIPMENT USED BY
TAYLOR AND WHITE IN
1898 IN THE DEVELOP-
MENT OF BETHLEHEM
HIGH SPEED TOOL
STEELS



SECTION V

BETHLEHEM SPECIAL ALLOY TOOL STEELS

NAIL DIE SHAPES

CHROME BALL RACE STEELS

PERMANENT MAGNET STEELS

HOT WORK STEELS

NICKEL STEEL

CORROSION RESISTING STEELS

For general instructions, see page 62

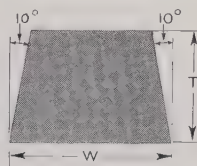
Extras for size and annealing, page 57



FINISHING AND INSPECTION DEPARTMENT

NAIL DIE SHAPES

Nail Die Shape steel is made from Carbon Tool Steel and from Bethlehem Special High Speed Tool Steel, as specified, in the sizes and weights given below.



NAIL DIE SHAPES—WEIGHTS AND DIMENSIONS

T INCHES	W INCHES	WEIGHT PER FOOT, POUNDS	
		CARBON	HIGH SPEED
$\frac{7}{16}$	$\frac{11}{16}$	.910	1.004
$\frac{13}{32}$	$\frac{11}{16}$	.966	1.066
$\frac{9}{16}$	$\frac{3}{4}$	1.246	1.374
$\frac{13}{16}$	$\frac{13}{16}$	1.367	1.508
$\frac{11}{16}$	$\frac{15}{16}$	1.910	2.107
$\frac{11}{16}$	$1\frac{1}{8}$	2.349	2.591
$\frac{13}{16}$	$1\frac{3}{8}$	3.407	3.758
$\frac{15}{16}$	$1\frac{1}{2}$	4.257	4.695
$\frac{15}{16}$	$1\frac{13}{16}$	5.253	5.794
$1\frac{1}{8}$	$1\frac{5}{8}$	5.458	6.020
$1\frac{3}{8}$	$1\frac{27}{32}$	7.490	8.262
$1\frac{3}{8}$	$2\frac{1}{2}$	10.506	11.586

BETHLEHEM CHROME BALL RACE STEELS

Bethlehem Chrome Ball Race Steel is a water hardening steel suitable for cups, cones, thrust and annular ball bearings, rollers, roller paths, etc. Being thoroughly annealed, it may therefore be rapidly machined, and is in every respect very well suited for this purpose.

State in detail the purpose for which the steel will be used

BETHLEHEM NO. 1 PERMANENT MAGNET STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.



BETHLEHEM
NO.1 PERMANENT
MAGNET STEEL

USES

Bethlehem No. 1 Permanent Magnet Steel is a tungsten magnet steel which possesses the properties of being readily worked and of stability. Annealing has less effect on the magnetic properties of Bethlehem No. 1 Permanent Magnet Steel than in the case of the chromium magnet steels. It has been developed for use in all instruments which require maximum magnetic strength and permanence.

This steel is hardened by quenching in water, with a minimum amount of warpage. Because of the inherent qualities imparted by the tungsten content, the magnetic properties of this steel are considerably less subject to change after hardening and magnetizing, than those of the more generally adopted chromium magnetic steels.

BETHLEHEM NO. 2 PERMANENT MAGNET STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.



BETHLEHEM
NO.2 PERMANENT
MAGNET STEEL

USES

Bethlehem No. 2 Permanent Magnet Steel is a chrome magnet steel possessing the properties of strength and toughness and also high magnetic strength. It is recommended for permanent magnets used in generators, speedometers,

magnetos and similar apparatus, and because of its oil hardening, non-shrinking, non-warping properties, is adapted to rapid and economical mass production.

These Magnet Steels are tested before shipment, assuring a product having uniform and maximum magnetic properties.

Extras for size and annealing are given on pages 58 and 59.

BETHLEHEM NO. 57 HOT WORK TOOL STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

57

HW

BETHLEHEM
NO. 57 HOT WORK
TOOL STEEL

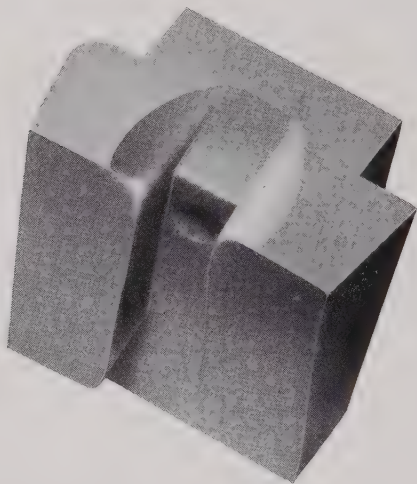
USES

Bethlehem No. 57 Hot Work Tool Steel is a chrome-tungsten steel, especially developed for hot work tools. This steel possesses the exceptional qualities of toughness and hardness when working hot metal, which enable it to resist remarkably well the battering action of the header in the hot-heading of bolts and rivets. It is recommended for the following purposes: hot bolt, rivet and spike heading gripper or open dies and headers; hot nut crowners; piercers and punches; hydraulic riveter dies; bull-dozer dies; compression dies; shear blades; hot chipping chisels, etc.

Hardening

Preheat slowly and uniformly to a temperature of about 1550 deg. Fahr. (a light cherry red color), then heat as rapidly as possible up to a temperature of 2000 to 2100 deg. Fahr. (a light yellow color). Quench in an oil bath which is large enough to rapidly radiate the heat.

State in detail the purpose for which the steel will be used



AUTOMATIC SPIKE DIE—MADE OF NO. 57 HOT WORK TOOL STEEL

Tempering

Temper from 500 to 1200 deg. Fahr. The correct drawing temperature will depend upon conditions, size of the tools, etc. For this reason it is practically impossible to give definite tempering instructions. Full information will be given upon application and receipt of details.

ANNEALING

Annealing instructions are the same as those which apply to Bethlehem Special High Speed Tool Steel, shown on page 11.

Extras for size and annealing are given on pages 60 and 61.

State in detail the purpose for which the steel will be used

BETHLEHEM NO. 445 HOT WORK TOOL STEEL

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

445

HW

BETHLEHEM
NO. 445 HOT WORK
TOOL STEEL

USES

Bethlehem No. 445 Hot Work Tool Steel is a chrome steel, developed for the same purposes as Bethlehem No. 57 Hot Work Tool Steel. It has been found equally satisfactory, except where the duty is abnormally severe or when the tool is subjected to unusually high temperatures.

HARDENING

To harden the steel, heat slowly and uniformly to a temperature of 1575 to 1625 deg. Fahr. (a light cherry red color). Quench in an oil bath which is large enough to rapidly radiate the heat.

TEMPERING

Temper from 450 to 1100 deg. Fahr. The drawing temperature will depend upon conditions, size of tools, etc. For this reason it is practically impossible to give definite tempering instructions. Full information will be given upon application and receipt of details.

ANNEALING

Annealing instructions are the same as those which apply to Bethlehem Special High Speed Tool Steel, shown on page 11.

Extras for size and annealing are given on pages 58 and 59.

State in detail the purpose for which the steel will be used

BETHLEHEM NO. 6 NICKEL STEEL

(34.00% to 36.00% Nickel)

**BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.****6****NS****BETHLEHEM
NO. 6 NICKEL STEEL**

Bethlehem No. 6 Nickel Steel is a non-corrosive alloy steel having a low coefficient of expansion.

This steel is recommended as a machinery steel for uses requiring non-corrosive and non-scaling properties, together with a low coefficient of expansion and for use in instruments consisting of parts requiring a low coefficient of expansion.

No. 6 Nickel Steel is furnished in the form of bars, discs, blocks and forging billets, in the black as rolled, or forged condition. Rolled bars are furnished in the rough turned or ground condition.

**GRINDING TOOL STEEL BILLETS**

BETHLEHEM CORROSION RESISTING STEELS

BETHLEHEM STAINLESS STEEL—TYPE C

This alloy was formerly sold as Bethlehem Stainless Iron. It is the most generally useful and most popular type of corrosion resisting steel. Chemically, it is a low carbon steel containing approximately 12 per cent. of chromium.

This steel possesses a remarkable range of physical properties combined with a high degree of corrosion resistance in the annealed or heat treated condition. Toughness and resistance to fatigue are outstanding properties of the alloy throughout its range of tensile strength (70,000 to 140,000 pounds per sq. in.)

Type C Stainless Steel is suited for the fabrication of practically all articles which are normally made from steel and can also be used to advantage to replace brass, bronze and other non-ferrous metals in many instances. Due to the high alloy content, more care and time are required to forge and machine this steel than in the case of common steels.

The use of Bethlehem Type C Stainless Steel will be found profitable wherever atmospheric or water corrosion impairs the life of steel articles. It is also applicable in those cases where non-ferrous metals are used to resist mild chemical attack. It is not suited to resist the action of strong chemical reagents such as the mineral acids; nor is it suited for purposes which require alloys that can be electroplated and polished, as in the case of trimmings and similar articles.

The chemical stability of the alloy gives considerable resistance to oxidation at elevated temperatures and many uses have been found for it in equipment subject to temperatures up to 1200 deg. Fahr.

As in the case of all special steels, the customer can be served best by Bethlehem Steel Company's staff of trained metallurgists if the details are given relative to the customer's

application for the particular alloy under consideration. The proper analysis of corrosion resisting steel for any particular use will be gladly furnished as well as details of methods of manufacture and heat treatment which will assure satisfactory service.

BETHLEHEM STAINLESS STEEL—TYPE A

Bethlehem Stainless Steel Type A is similar to type C with the exception of its carbon content, which is high enough to permit hardening to a range suitable for the making of cutlery and similar purposes. For parts requiring corrosion resistance combined with a hardness approaching that of tool steel, this composition will be found in a class by itself.

When hardness is not required, Type C should be used in preference to Type A, as the latter is somewhat more difficult to work and requires heat treatment and polishing or pickling to develop its corrosion resistance as well as its hardness.

BETHLEHEM CORROSION RESISTING STEELS

No. 2 and No. 3

Bethlehem Corrosion Resisting Steels No. 2 and No. 3 are nickel-chromium steels and are recommended for certain uses where a higher degree of corrosion resistance is required than that of the ordinary chromium steels or where their unusual physical properties can be applied to advantage. Both steels are austenitic and are therefore practically unaffected by heat treatment. They possess unusual ductility and are normally soft, although they are difficult to machine due to a pronounced tendency to work-harden.

Corrosion Resisting Steel No. 2 possesses the highest degree of resistance to atmospheric and salt water corrosion that is attainable in a ferrous alloy and will retain a polished surface indefinitely in the atmosphere.

Corrosion Resisting Steel No. 3 is particularly well adapted for use where resistance to strong chemical reagents including mineral acids is essential.

Both these alloys have a high degree of resistance to scaling and remarkably high physical properties at elevated temperatures.

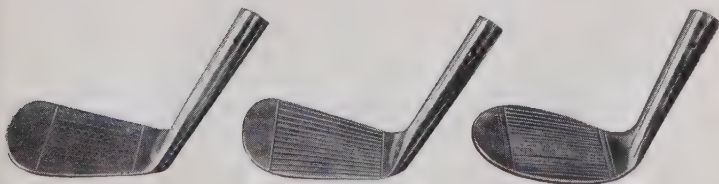
BETHLEHEM SPECIAL HIGH CHROMIUM STEELS

Bethlehem is in a position to furnish steels containing higher percentages of chromium than that of stainless types A and C. Steels in this class covering a wide range of analyses are used for special applications. Among these may be mentioned, nitric acid handling equipment, golf club heads (16-18% Chromium) and heat resisting equipment (20-30% Chromium.)

Bethlehem Steel Company is prepared to furnish all of the above steels in the following forms:

- Bars—Black as rolled, ground, or cold drawn
- Billets and Blooms
- Drop Forgings
- Press and Hammer Forgings

Further information regarding these steels and their uses may be found in a separate booklet which will gladly be furnished upon request. It is suggested that wherever possible the customer will let Bethlehem metallurgists help in the selection of the steel best suited to the particular requirements.



STAINLESS STEEL GOLF CLUB HEADS



POURING
INGOTS OF
TOOL STEEL



ROLLING TOOL STEEL BILLETS

FORGING
TOOL STEEL
INGOT



ROLLING TOOL STEEL BARS FROM BILLETS

TOOL STEEL DISCS

We are prepared to furnish Discs of all our grades of tool steel, for milling cutters, drawing dies, rolls, etc.

WEIGHT OF TOOL STEEL DISCS

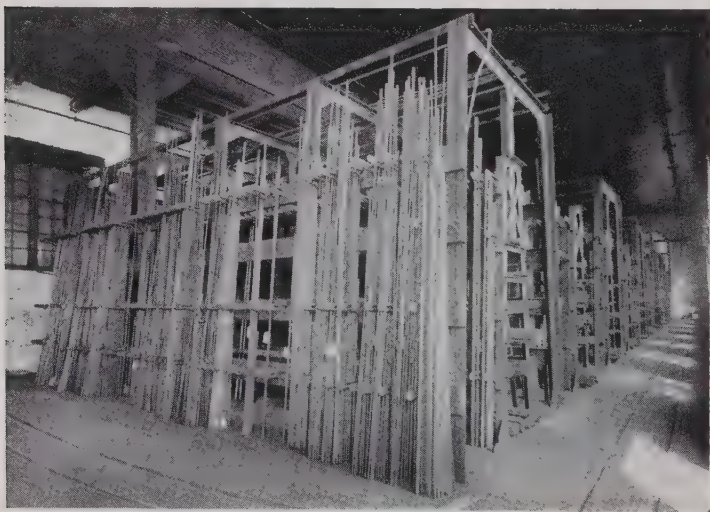
The estimated weights of tool steel discs 1 inch wide, up to and including 48 inches in diam., are shown on pages 66 to 69.

To find the estimated weight of a disc with a width greater than 1 inch, multiply the weight per inch by the width of disc in inches.

For weight of High Speed Tool Steel Discs add 10%.

The size ordered will be furnished unless it is specified that an allowance for finish is desired.

Extras for size and annealing discs of Bethlehem Special High Speed Tool Steel are given on page 61 and extras for size and annealing carbon tool steels are given on page 59.



BETHLEHEM TOOL STEEL WAREHOUSE

SECTION VI

INSTRUCTIONS FOR WORKING
BRAND NAMES
STANDARD CLASSIFICATION
OF EXTRAS

A line of small, illegible text, likely a copyright notice or legal disclaimer, spanning the width of the page.

WARRANTY

Any steel will be replaced which, if properly selected and used, shall prove defective, but no claims for labor or damage will be allowed.

CLASS OF EXTRAS TO APPLY TO BETHLEHEM TOOL STEELS

Brand Name	Class of Extras to Apply
Bethlehem Special High Speed Tool Steel.....	H
Bethlehem Extra Special High Speed Tool Steel.....	H
Bethlehem Finishing Tool Steel.....	H
Bethlehem XXX Special Tool Steel.....	C
Bethlehem Superior Tool Steel.....	C
Bethlehem XX Tool Steel.....	C
Bethlehem XCL Tool Steel.....	C
Bethlehem X Tool Steel.....	C
Bethlehem Tool Room Oil Hardening Tool Steel....	C
Bethlehem No. 71 Alloy Tool Steel.....	C
Bethlehem Tough Tool Steel.....	C
Bethlehem Lehigh Die and Tool Steel.....	C
Bethlehem No. 67 Tool Steel.....	C
Bethlehem Superior Hollow Drill Steel.....	C
Bethlehem Permanent Magnet Steel No. 1.....	C
Bethlehem Permanent Magnet Steel No. 2.....	C
Bethlehem Chrome Ball Race Steel.....	C
Bethlehem No. 6 Nickel Steel.....	C
Bethlehem No. 57 Hot Work Tool Steel.....	H
Bethlehem No. 445 Hot Work Tool Steel.....	C

NOTE:—In the table above, the letter C indicates that the steel takes the Carbon Tool Steel extras; and the letter H indicates that the steel takes the High Speed Tool Steel extras.

See following pages for Standard Classification of Extras

BETHLEHEM CARBON TOOL STEELS STANDARD CLASSIFICATION OF EXTRAS

Base Price upon Application

EXTRAS FOR ROUNDS, SQUARES, OCTAGONS AND HEXAGONS

$\frac{5}{8}$ to 2 inches.....Base

Inches	Extra per lb. Cents	Inches	Extra per lb. Cents
$2\frac{1}{8}$ to 3.....	1.0	$\frac{9}{16}$ to $\frac{1}{2}$	0.5
$3\frac{1}{8}$ to 4.....	1.5	$\frac{1}{16}$ to $\frac{3}{8}$	1.0
$4\frac{1}{8}$ to 5.....	2.0	$\frac{5}{16}$ and $\frac{11}{32}$	2.0
$5\frac{1}{8}$ to 6.....	2.5	$\frac{1}{4}$ and $\frac{9}{32}$	3.0
$6\frac{1}{8}$ to 7.....	3.0	$\frac{3}{16}$	5.0
$7\frac{1}{8}$ to 8.....	3.5	$\frac{5}{32}$	10.0
$8\frac{1}{8}$ to 9.....	4.0	$\frac{1}{8}$	18.0
$9\frac{1}{8}$ to 10.....	5.0		

EXTRAS FOR FLATS

$\frac{5}{8}$ to 2 inches thick x $\frac{9}{16}$ to 2 inches wide.....Base

Inches	Extra per lb. Cents	Inches	Extra per lb. Cents
$\frac{1}{8}$ x $\frac{3}{16}$	20.0	$\frac{5}{16}$ x $\frac{3}{8}$ to $\frac{5}{8}$	1.5
$\frac{1}{8}$ x $\frac{1}{4}$	15.0	$\frac{5}{16}$ x $\frac{11}{16}$ to 8.....	1.0
$\frac{1}{8}$ x $\frac{5}{16}$	8.0	$\frac{3}{8}$ x $\frac{1}{16}$ to 8.....	1.0
$\frac{1}{8}$ x $\frac{3}{8}$	4.0	$\frac{7}{16}$ x $\frac{1}{2}$ to 8.....	1.0
$\frac{1}{8}$ x $\frac{7}{16}$ to $\frac{1}{2}$	3.0	$\frac{1}{2}$ x $\frac{9}{16}$ to 8.....	1.0
$\frac{1}{8}$ x $\frac{9}{16}$ to 7.....	2.0	$\frac{9}{16}$ x $2\frac{1}{8}$ to 8.....	1.0
$\frac{1}{8}$ x $7\frac{1}{8}$ to 8.....	3.0	$\frac{5}{8}$ to 2 x $2\frac{1}{8}$ to 7.....	1.0
$\frac{3}{16}$ x $\frac{1}{4}$	5.0	$\frac{5}{8}$ to $1\frac{3}{4}$ x $7\frac{1}{8}$ to 8.....	1.0
$\frac{3}{16}$ x $\frac{5}{16}$	4.0	$1\frac{7}{8}$ to 2 x $7\frac{1}{8}$ to 8.....	1.5
$\frac{3}{16}$ x $\frac{3}{8}$	3.0	$2\frac{1}{8}$ to 3 x $2\frac{1}{8}$ to 5.....	1.0
$\frac{3}{16}$ x $\frac{7}{16}$ to $\frac{5}{8}$	2.0	$2\frac{1}{8}$ to 3 x $5\frac{1}{8}$ to 8.....	1.5
$\frac{3}{16}$ x $\frac{11}{16}$ to 2.....	1.5	$3\frac{1}{8}$ to 4 x $3\frac{1}{8}$ to 6.....	1.5
$\frac{3}{16}$ x $2\frac{1}{8}$ to 7.....	1.0	$3\frac{1}{8}$ to 4 x $6\frac{1}{8}$ to 8.....	2.0
$\frac{3}{16}$ x $7\frac{1}{8}$ to 8.....	2.0	$4\frac{1}{8}$ to 5 x $4\frac{1}{8}$ to 7.....	2.0
$\frac{1}{4}$ x $\frac{5}{16}$ to $\frac{3}{8}$	2.0	$4\frac{1}{8}$ to 5 x $7\frac{1}{8}$ to 8.....	2.5
$\frac{1}{4}$ x $\frac{7}{16}$ to $\frac{5}{8}$	1.5	$5\frac{1}{8}$ to 6 x $5\frac{1}{8}$ to 8.....	2.5
$\frac{1}{4}$ x $\frac{11}{16}$ to 2.....	1.5	$6\frac{1}{8}$ to 7 x $6\frac{1}{8}$ to 7.....	3.0
$\frac{1}{4}$ x $2\frac{1}{8}$ to 7.....	1.0	$6\frac{1}{8}$ to 8 x $7\frac{1}{8}$ to 8.....	3.5
$\frac{1}{4}$ x $7\frac{1}{8}$ to 8.....	2.0	Over 8 add.....	0.5

Intermediate sizes take the next higher extra

EXTRA FOR ANNEALING—1 cent per lb.

BOXING—at cost

EXTRAS FOR CUTTING (to Specified Single and Multiple Lengths)

	Per lb.		Per lb.
24 inches or over.....	0.5 cent	12 to 18 inches.....	1.5 cents
18 to 24 inches.....	1.0 cent	6 to 12 inches.....	2.0 cents

Less than 6 inches, special price. Over 18 feet, special price.

BETHLEHEM CARBON TOOL STEELS

STANDARD CLASSIFICATION OF EXTRAS—(Continued)

EXTRAS FOR DISCS	Extra per lb. Cents
Under 1 pound.....	15
Weighing 1 to 2 pounds.....	12
Weighing 2 to 3 pounds.....	11
Weighing 3 to 4 pounds.....	10
Weighing 4 to 5 pounds.....	9
Weighing 5 to 7½ pounds.....	8
Weighing 7½ to 10 pounds.....	7
Weighing 10 to 15 pounds.....	6
Weighing 15 to 20 pounds.....	5
Weighing 20 to 25 pounds.....	4
Weighing above 25 pounds.....	3
Annealing.....	1

EXTRAS FOR DIE BLOCKS	Extra per lb. Cents
Under 1 pound.....Special Price	
Weighing 1 to 2 pounds.....	12
Weighing 2 to 3 pounds.....	11
Weighing 3 to 5 pounds.....	9
Weighing 5 to 7½ pounds.....	8
Weighing 7½ to 10 pounds.....	7
Weighing 10 to 15 pounds.....	5
Weighing 15 to 25 pounds.....	3
Weighing above 25 pounds.....	2
Annealing.....	1

DISCS and DIE BLOCKS will be furnished to the size ordered unless it is specified that an allowance for finish is desired

State in detail the purpose for which the steel will be used

BETHLEHEM SPECIAL HIGH SPEED TOOL STEEL

STANDARD CLASSIFICATION OF EXTRAS EXTRAS FOR ROUNDS, SQUARES AND OCTAGONS

$\frac{5}{8}$ to 2 inches.....		Base	
Inches	Extra per lb. Cents	Inches	Extra per lb. Cents
$2\frac{1}{8}$ to $2\frac{1}{2}$	2.0	$7\frac{5}{8}$ to 8.....	7.5
$2\frac{5}{8}$ to 3.....	2.5	$8\frac{1}{8}$ to $8\frac{1}{2}$	8.0
$3\frac{1}{8}$ to $3\frac{1}{2}$	3.0	$8\frac{5}{8}$ to 9.....	8.5
$3\frac{5}{8}$ to 4.....	3.5	$9\frac{1}{8}$ to $9\frac{1}{2}$	10.0
$4\frac{1}{8}$ to $4\frac{1}{2}$	4.0	$9\frac{5}{8}$ to 10.....	11.0
$4\frac{5}{8}$ to 5.....	4.5	$10\frac{1}{8}$ to $10\frac{1}{2}$	12.0
$5\frac{1}{8}$ to $5\frac{1}{2}$	5.0	$\frac{9}{16}$ to $\frac{1}{2}$	2.0
$5\frac{5}{8}$ to 6.....	5.5	$\frac{7}{16}$ to $\frac{3}{8}$	3.5
$6\frac{1}{8}$ to $6\frac{1}{2}$	6.0	$\frac{5}{16}$ to $\frac{11}{32}$	6.0
$6\frac{5}{8}$ to 7.....	6.5	$\frac{1}{4}$ to $\frac{9}{32}$	8.5
$7\frac{1}{8}$ to $7\frac{1}{2}$	7.0	$\frac{3}{16}$ to $\frac{7}{32}$	15.0

EXTRAS FOR FLATS

$\frac{5}{8}$ to 2 inches thick x $\frac{5}{8}$ to 2 inches wide.....		Base	
Inches	Extra per lb. Cents	Inches	Extra per lb. Cents
$\frac{1}{8}$ x $\frac{3}{16}$	40.0	$\frac{3}{8}$ x $\frac{7}{8}$ to $1\frac{1}{2}$	3.0
$\frac{1}{8}$ x $\frac{1}{4}$	30.0	$\frac{3}{8}$ x $1\frac{5}{8}$ to 5.....	2.5
$\frac{1}{8}$ x $\frac{5}{16}$	20.0	$\frac{7}{16}$ x $\frac{1}{2}$ to 1.....	3.0
$\frac{1}{8}$ x $\frac{3}{8}$ to 2.....	14.0	$\frac{7}{16}$ x $\frac{1}{8}$ to $5\frac{1}{2}$	2.5
$\frac{3}{16}$ x $\frac{1}{4}$ to 3.....	14.0	$\frac{1}{2}$ x $\frac{5}{8}$ to 1.....	2.5
$\frac{1}{4}$ x $\frac{5}{16}$ to $\frac{1}{2}$	8.0	$\frac{1}{2}$ x $1\frac{1}{8}$ to 6.....	2.0
$\frac{1}{4}$ x $\frac{5}{8}$ to 1.....	5.0	$\frac{9}{16}$ x $\frac{5}{8}$ to 1.....	2.5
$\frac{1}{4}$ x $1\frac{1}{8}$ to 4.....	3.0	$\frac{9}{16}$ x $1\frac{1}{8}$ to 6.....	2.0
$\frac{5}{16}$ x $\frac{3}{8}$ to $\frac{5}{8}$	5.0	$\frac{5}{8}$ to 2 x $2\frac{1}{8}$ to 4.....	2.0
$\frac{5}{16}$ x $\frac{3}{4}$ to 1.....	3.5	$\frac{5}{8}$ to 2 x $4\frac{1}{8}$ to 7.....	4.0
$\frac{5}{16}$ x $1\frac{1}{8}$ to $4\frac{1}{2}$	3.0	$2\frac{1}{8}$ to 3 x $2\frac{1}{8}$ to 4.....	2.0
$\frac{3}{8}$ x $\frac{7}{16}$ to $\frac{3}{4}$	3.0	$2\frac{1}{8}$ to 3 x $4\frac{1}{8}$ to 7.....	4.0

All dimensions inclusive.

Intermediate sizes take the next higher extra.

EXTRAS FOR ANNEALING—2 cents per lb.

EXTRAS FOR BEVELS—Bevels same classification as flat plus 10 cents per lb. for shape.

EXTRAS FOR CUTTING (to Specified Single and Multiple Lengths)

Extra per lb. Cents	Extra per lb. Cents
24 inches and over..... 1	12 to $17\frac{15}{16}$ inches..... 3
18 to $23\frac{15}{16}$ inches..... 2	6 to $11\frac{15}{16}$ inches..... 4

Less than 6 inches, special prices.

BETHLEHEM SPECIAL HIGH SPEED TOOL STEEL

STANDARD CLASSIFICATION OF EXTRAS—(Continued)

EXTRAS FOR DISCS	Extra per lb. Cents
Weighing 1 to 2 pounds.....	24
Weighing 2 to 3 pounds.....	22
Weighing 3 to 5 pounds.....	18
Weighing 5 to 7½ pounds.....	16
Weighing 7½ to 10 pounds.....	14
Weighing 10 to 15 pounds.....	12
Weighing 15 to 25 pounds.....	10
Weighing above 25 pounds.....	6
Annealing.....	2

EXTRAS FOR DIE BLOCKS	Extra per lb. Cents
Weighing 1 to 2 pounds.....	24
Weighing 2 to 3 pounds.....	22
Weighing 3 to 5 pounds.....	18
Weighing 5 to 7½ pounds.....	16
Weighing 7½ to 10 pounds.....	14
Weighing 10 to 15 pounds.....	10
Weighing 15 to 25 pounds.....	6
Weighing above 25 pounds.....	4
Annealing.....	2

DISCS and DIE BLOCKS will be furnished to the size ordered unless it is specified that an allowance for finish is desired

BETHLEHEM SUPERIOR HOLLOW DRILL STEEL

Unless otherwise specified, random mill lengths will be furnished. If ordered cut to special lengths, an extra charge of 1 cent per pound will be made.

State in detail the purpose for which the steel will be used

INSTRUCTIONS FOR WORKING BETHLEHEM TOOL STEELS

It is well known to those skilled in the art of steel treating that it is a very difficult matter to lay down hard and fast rules for the successful hardening of tool steels, as much depends on the shape and size or mass of steel to be hardened, the carbon content or temper number in the case of carbon tool steels, and the composition of the special or alloy tool steel. However, we are always ready and willing to advise and give our customers the benefit of our long and diversified experience in the use and heat treatment of all our steels, provided they will describe in detail the kind or grade of steel and the purpose for which it is to be used. If the tool cannot be described, a drawing or rough sketch, with approximate dimensions, will assist us materially in recommending the grade of steel, and the heat treatment to obtain the best results.

FORGING

Heat the piece slowly and uniformly in a clean fire or furnace to a temperature of 1500 to 1600 deg. Fahr. (a light cherry red). Allow sufficient time in heating to permit the forging heat to penetrate to the center, bearing in mind that while it is necessary to heat slowly it is very much more important that the piece be heated to the forging heat throughout. Be careful not to hold the steel in the fire or furnace any longer than necessary. Too long an exposure at the forging heat will cause excessive scaling and decarbonization of the outer surface. After forging, all intricate or irregular shaped tools, such as goose neck planer tools, spring tools, etc., should be reheated to the annealing temperature, 1400 to 1450 deg. Fahr., buried in dry ashes or slaked lime and left there until cold, to remove forging stresses.

GRINDING

After forging and before hardening, lathe and planer finishing tools, and similar tools, should be rough ground to the shape desired. This eliminates excessive grinding after hardening and thereby avoids the danger of checking or overheating the cutting edge during the final grinding operation.

ANNEALING

To anneal tool steel, thoroughly pack it with granulated charcoal in an iron box or pipe with about one-half an inch ($\frac{1}{2}$ ") of charcoal between the steel to be annealed and the walls of the pipe or box. Seal carefully and heat slowly and uniformly to a temperature of about 1400 to 1450 deg. Fahr., allowing sufficient time to permit the heat to penetrate to the center of the piece. Cool off slowly, preferably with the furnace; or the box or pipe may be removed from the furnace and buried in dry ashes, mica or lime and left there until cold.

Always specify whether annealed or unannealed steel is desired. To get under the "bark," order annealed tool steel bars large enough to remove at least one-sixteenth of an inch from the diameter of small sections and one-eighth of an inch from the diameter of large sections.

We do not want to create the impression that Bethlehem tool steels require exceptionally careful handling to obtain the best results. The above suggestions are intended for the guidance of those who are learning the art of tool making and hardening. The experienced mechanic who knows and practices the fundamental principles will have no difficulty in obtaining good results.



THREE-TON ELECTRIC FURNACE USED EXCLUSIVELY FOR PRODUCTION OF BETHLEHEM HIGH SPEED TOOL STEELS

SECTION VII



TABLES AND USEFUL INFORMATION

ROUND STEEL—WEIGHT PER LINEAR INCH

Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.
0		0	2.01	0	8.03	0	18.07
$\frac{1}{16}$		$\frac{1}{16}$	2.09	$\frac{1}{16}$	8.20	$\frac{1}{16}$	18.32
$\frac{1}{8}$		$\frac{1}{8}$	2.18	$\frac{1}{8}$	8.37	$\frac{1}{8}$	18.58
$\frac{3}{16}$		$\frac{3}{16}$	2.27	$\frac{3}{16}$	8.54	$\frac{3}{16}$	18.83
$\frac{1}{4}$	.01	$\frac{1}{4}$	2.36	$\frac{1}{4}$	8.71	$\frac{1}{4}$	19.09
$\frac{5}{16}$	.02	$\frac{5}{16}$	2.45	$\frac{5}{16}$	8.89	$\frac{5}{16}$	19.34
$\frac{3}{8}$	.03	$\frac{3}{8}$	2.54	$\frac{3}{8}$	9.07	$\frac{3}{8}$	19.61
$\frac{7}{16}$	.04	$\frac{7}{16}$	2.64	$\frac{7}{16}$	9.25	$\frac{7}{16}$	19.87
$\frac{1}{2}$	.06	$\frac{1}{2}$	2.73	$\frac{1}{2}$	9.43	$\frac{1}{2}$	20.13
$\frac{9}{16}$	.07	$\frac{9}{16}$	2.83	$\frac{9}{16}$	9.61	$\frac{9}{16}$	20.40
$\frac{5}{8}$	.09	$\frac{5}{8}$	2.93	$\frac{5}{8}$	9.79	$\frac{5}{8}$	20.67
$\frac{11}{16}$	.11	$\frac{11}{16}$	3.03	$\frac{11}{16}$	9.98	$\frac{11}{16}$	20.93
$\frac{3}{4}$	.13	$\frac{3}{4}$	3.14	$\frac{3}{4}$	10.16	$\frac{3}{4}$	21.21
$\frac{13}{16}$	.15	$\frac{13}{16}$	3.24	$\frac{13}{16}$	10.35	$\frac{13}{16}$	21.48
$\frac{7}{8}$	.17	$\frac{7}{8}$	3.35	$\frac{7}{8}$	10.54	$\frac{7}{8}$	21.76
$\frac{15}{16}$	.20	$\frac{15}{16}$	3.46	$\frac{15}{16}$	10.74	$\frac{15}{16}$	22.03
0	.22	0	3.57	0	10.93	0	22.31
$\frac{1}{16}$	.25	$\frac{1}{16}$	3.68	$\frac{1}{16}$	11.13	$\frac{1}{16}$	22.59
$\frac{1}{8}$	.28	$\frac{1}{8}$	3.80	$\frac{1}{8}$	11.33	$\frac{1}{8}$	22.87
$\frac{3}{16}$	.31	$\frac{3}{16}$	3.91	$\frac{3}{16}$	11.52	$\frac{3}{16}$	23.15
$\frac{1}{4}$	.35	$\frac{1}{4}$	4.03	$\frac{1}{4}$	11.73	$\frac{1}{4}$	23.44
$\frac{5}{16}$	.38	$\frac{5}{16}$	4.14	$\frac{5}{16}$	11.93	$\frac{5}{16}$	23.72
$\frac{3}{8}$	.42	$\frac{3}{8}$	4.27	$\frac{3}{8}$	12.13	$\frac{3}{8}$	24.01
$\frac{7}{16}$	.46	$\frac{7}{16}$	4.39	$\frac{7}{16}$	12.34	$\frac{7}{16}$	24.30
$\frac{1}{2}$	.50	$\frac{1}{2}$	4.52	$\frac{1}{2}$	12.55	$\frac{1}{2}$	24.60
$\frac{9}{16}$	.54	$\frac{9}{16}$	4.64	$\frac{9}{16}$	12.76	$\frac{9}{16}$	24.89
$\frac{5}{8}$	.59	$\frac{5}{8}$	4.77	$\frac{5}{8}$	12.97	$\frac{5}{8}$	25.19
$\frac{11}{16}$	.64	$\frac{11}{16}$	4.90	$\frac{11}{16}$	13.18	$\frac{11}{16}$	25.48
$\frac{3}{4}$	.68	$\frac{3}{4}$	5.03	$\frac{3}{4}$	13.40	$\frac{3}{4}$	25.78
$\frac{13}{16}$	.73	$\frac{13}{16}$	5.17	$\frac{13}{16}$	13.61	$\frac{13}{16}$	26.08
$\frac{7}{8}$	.78	$\frac{7}{8}$	5.30	$\frac{7}{8}$	13.84	$\frac{7}{8}$	26.39
$\frac{15}{16}$	.84	$\frac{15}{16}$	5.44	$\frac{15}{16}$	14.05	$\frac{15}{16}$	26.68
0	.89	0	5.58	0	14.28	0	27.00
$\frac{1}{16}$	.95	$\frac{1}{16}$	5.72	$\frac{1}{16}$	14.50	$\frac{1}{16}$	27.30
$\frac{1}{8}$	1.01	$\frac{1}{8}$	5.86	$\frac{1}{8}$	14.73	$\frac{1}{8}$	27.61
$\frac{3}{16}$	1.07	$\frac{3}{16}$	6.00	$\frac{3}{16}$	14.95	$\frac{3}{16}$	27.92
$\frac{1}{4}$	1.13	$\frac{1}{4}$	6.15	$\frac{1}{4}$	15.18	$\frac{1}{4}$	28.24
$\frac{5}{16}$	1.19	$\frac{5}{16}$	6.30	$\frac{5}{16}$	15.41	$\frac{5}{16}$	28.54
$\frac{3}{8}$	1.26	$\frac{3}{8}$	6.45	$\frac{3}{8}$	15.65	$\frac{3}{8}$	28.87
$\frac{7}{16}$	1.33	$\frac{7}{16}$	6.60	$\frac{7}{16}$	15.88	$\frac{7}{16}$	29.19
$\frac{1}{2}$	1.39	$\frac{1}{2}$	6.75	$\frac{1}{2}$	16.12	$\frac{1}{2}$	29.50
$\frac{9}{16}$	1.46	$\frac{9}{16}$	6.90	$\frac{9}{16}$	16.36	$\frac{9}{16}$	29.83
$\frac{5}{8}$	1.54	$\frac{5}{8}$	7.06	$\frac{5}{8}$	16.60	$\frac{5}{8}$	30.15
$\frac{11}{16}$	1.61	$\frac{11}{16}$	7.22	$\frac{11}{16}$	16.83	$\frac{11}{16}$	30.47
$\frac{3}{4}$	1.69	$\frac{3}{4}$	7.38	$\frac{3}{4}$	17.08	$\frac{3}{4}$	30.80
$\frac{13}{16}$	1.76	$\frac{13}{16}$	7.54	$\frac{13}{16}$	17.32	$\frac{13}{16}$	31.12
$\frac{7}{8}$	1.84	$\frac{7}{8}$	7.70	$\frac{7}{8}$	17.57	$\frac{7}{8}$	31.46
$\frac{15}{16}$	1.92	$\frac{15}{16}$	7.86	$\frac{15}{16}$	17.82	$\frac{15}{16}$	31.79

For HIGH SPEED STEEL add 10 per cent.

ROUND STEEL—WEIGHT PER LINEAR INCH

Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.
0	32.13	0	50.19	0	72.27	0	98.37
$\frac{1}{16}$	32.46	$\frac{1}{16}$	50.61	$\frac{1}{16}$	72.77	$\frac{1}{16}$	98.94
$\frac{1}{8}$	32.80	$\frac{1}{8}$	51.03	$\frac{1}{8}$	73.28	$\frac{1}{8}$	99.54
$\frac{3}{16}$	33.13	$\frac{3}{16}$	51.45	$\frac{3}{16}$	73.78	$\frac{3}{16}$	100.13
$\frac{1}{4}$	33.48	$\frac{1}{4}$	51.87	$\frac{1}{4}$	74.29	$\frac{1}{4}$	100.72
$\frac{5}{16}$	33.81	$\frac{5}{16}$	52.30	$\frac{5}{16}$	74.80	$\frac{5}{16}$	101.32
$\frac{3}{8}$	34.17	$\frac{3}{8}$	52.73	$\frac{3}{8}$	75.31	$\frac{3}{8}$	101.91
$\frac{7}{16}$	34.51	$\frac{7}{16}$	53.16	$\frac{7}{16}$	75.82	$\frac{7}{16}$	102.51
$\frac{1}{2}$	34.86	$\frac{1}{2}$	53.59	$\frac{1}{2}$	76.34	$\frac{1}{2}$	103.11
$\frac{9}{16}$	35.21	$\frac{9}{16}$	54.02	$\frac{9}{16}$	76.86	$\frac{9}{16}$	103.71
$\frac{5}{8}$	35.56	$\frac{5}{8}$	54.46	$\frac{5}{8}$	77.38	$\frac{5}{8}$	104.31
$\frac{11}{16}$	35.91	$\frac{11}{16}$	54.89	$\frac{11}{16}$	77.90	$\frac{11}{16}$	104.91
$\frac{3}{4}$	36.27	$\frac{3}{4}$	55.33	$\frac{3}{4}$	78.42	$\frac{3}{4}$	105.52
$\frac{13}{16}$	36.62	$\frac{13}{16}$	55.77	$\frac{13}{16}$	78.94	$\frac{13}{16}$	106.13
$\frac{7}{8}$	36.98	$\frac{7}{8}$	56.21	$\frac{7}{8}$	79.47	$\frac{7}{8}$	106.73
$\frac{15}{16}$	37.33	$\frac{15}{16}$	56.66	$\frac{15}{16}$	79.99	$\frac{15}{16}$	107.35
0	37.70	0	57.10	0	80.52	0	107.96
$\frac{1}{16}$	38.06	$\frac{1}{16}$	57.55	$\frac{1}{16}$	81.05	$\frac{1}{16}$	108.57
$\frac{1}{8}$	38.42	$\frac{1}{8}$	57.99	$\frac{1}{8}$	81.59	$\frac{1}{8}$	109.19
$\frac{3}{16}$	38.79	$\frac{3}{16}$	58.45	$\frac{3}{16}$	82.12	$\frac{3}{16}$	109.81
$\frac{1}{4}$	39.16	$\frac{1}{4}$	58.90	$\frac{1}{4}$	82.66	$\frac{1}{4}$	110.43
$\frac{5}{16}$	39.53	$\frac{5}{16}$	59.35	$\frac{5}{16}$	83.19	$\frac{5}{16}$	111.05
$\frac{3}{8}$	39.90	$\frac{3}{8}$	59.81	$\frac{3}{8}$	83.73	$\frac{3}{8}$	111.67
$\frac{7}{16}$	40.28	$\frac{7}{16}$	60.27	$\frac{7}{16}$	84.27	$\frac{7}{16}$	112.29
$\frac{1}{2}$	40.65	$\frac{1}{2}$	60.73	$\frac{1}{2}$	84.82	$\frac{1}{2}$	112.92
$\frac{9}{16}$	41.03	$\frac{9}{16}$	61.19	$\frac{9}{16}$	85.36	$\frac{9}{16}$	113.55
$\frac{5}{8}$	41.41	$\frac{5}{8}$	61.65	$\frac{5}{8}$	85.91	$\frac{5}{8}$	114.18
$\frac{11}{16}$	41.79	$\frac{11}{16}$	62.11	$\frac{11}{16}$	86.45	$\frac{11}{16}$	114.81
$\frac{3}{4}$	42.17	$\frac{3}{4}$	62.58	$\frac{3}{4}$	87.00	$\frac{3}{4}$	115.44
$\frac{13}{16}$	42.56	$\frac{13}{16}$	63.05	$\frac{13}{16}$	87.56	$\frac{13}{16}$	116.08
$\frac{7}{8}$	42.94	$\frac{7}{8}$	63.52	$\frac{7}{8}$	88.11	$\frac{7}{8}$	116.72
$\frac{15}{16}$	43.33	$\frac{15}{16}$	63.99	$\frac{15}{16}$	88.66	$\frac{15}{16}$	117.35
0	43.72	0	64.46	0	89.22	0	118.00
$\frac{1}{16}$	44.11	$\frac{1}{16}$	64.94	$\frac{1}{16}$	89.78	$\frac{1}{16}$	118.64
$\frac{1}{8}$	44.50	$\frac{1}{8}$	65.41	$\frac{1}{8}$	90.34	$\frac{1}{8}$	119.28
$\frac{3}{16}$	44.90	$\frac{3}{16}$	65.89	$\frac{3}{16}$	90.90	$\frac{3}{16}$	119.93
$\frac{1}{4}$	45.29	$\frac{1}{4}$	66.37	$\frac{1}{4}$	91.47	$\frac{1}{4}$	120.57
$\frac{5}{16}$	45.69	$\frac{5}{16}$	66.85	$\frac{5}{16}$	92.03	$\frac{5}{16}$	121.22
$\frac{3}{8}$	46.09	$\frac{3}{8}$	67.34	$\frac{3}{8}$	92.60	$\frac{3}{8}$	121.87
$\frac{7}{16}$	46.49	$\frac{7}{16}$	67.82	$\frac{7}{16}$	93.17	$\frac{7}{16}$	122.52
$\frac{1}{2}$	46.90	$\frac{1}{2}$	68.31	$\frac{1}{2}$	93.74	$\frac{1}{2}$	123.18
$\frac{9}{16}$	47.30	$\frac{9}{16}$	68.80	$\frac{9}{16}$	94.31	$\frac{9}{16}$	123.84
$\frac{5}{8}$	47.71	$\frac{5}{8}$	69.29	$\frac{5}{8}$	94.88	$\frac{5}{8}$	124.50
$\frac{11}{16}$	48.12	$\frac{11}{16}$	69.78	$\frac{11}{16}$	95.46	$\frac{11}{16}$	125.15
$\frac{3}{4}$	48.53	$\frac{3}{4}$	70.28	$\frac{3}{4}$	96.04	$\frac{3}{4}$	125.82
$\frac{13}{16}$	48.94	$\frac{13}{16}$	70.77	$\frac{13}{16}$	96.62	$\frac{13}{16}$	126.48
$\frac{7}{8}$	49.35	$\frac{7}{8}$	71.27	$\frac{7}{8}$	97.20	$\frac{7}{8}$	127.14
$\frac{15}{16}$	49.77	$\frac{15}{16}$	71.77	$\frac{15}{16}$	97.78	$\frac{15}{16}$	127.81

For HIGH SPEED STEEL add 10 per cent.

ROUND STEEL—WEIGHT PER LINEAR INCH

Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.
0	128.48	0	162.61	0	200.75	0	242.91
$\frac{1}{16}$	129.17	$\frac{1}{16}$	163.36	$\frac{1}{16}$	201.58	$\frac{1}{16}$	243.82
$\frac{1}{8}$	129.82	$\frac{1}{8}$	164.12	$\frac{1}{8}$	202.42	$\frac{1}{8}$	244.75
$\frac{3}{16}$	130.49	$\frac{3}{16}$	164.87	$\frac{3}{16}$	203.27	$\frac{3}{16}$	245.67
$\frac{1}{4}$	131.17	$\frac{1}{4}$	165.63	$\frac{1}{4}$	204.11	$\frac{1}{4}$	246.60
$\frac{5}{16}$	131.85	$\frac{5}{16}$	166.39	$\frac{5}{16}$	204.95	$\frac{5}{16}$	247.53
$\frac{3}{8}$	132.53	$\frac{3}{8}$	167.15	$\frac{3}{8}$	205.80	$\frac{3}{8}$	248.46
$\frac{7}{16}$	133.20	$\frac{7}{16}$	167.92	$\frac{7}{16}$	206.64	$\frac{7}{16}$	249.38
$\frac{1}{2}$	133.89	$\frac{1}{2}$	168.68	$\frac{1}{2}$	207.50	$\frac{1}{2}$	250.32
$\frac{9}{16}$	134.57	$\frac{9}{16}$	169.45	$\frac{9}{16}$	208.34	$\frac{9}{16}$	251.25
$\frac{5}{8}$	135.26	$\frac{5}{8}$	170.22	$\frac{5}{8}$	209.20	$\frac{5}{8}$	252.19
$\frac{11}{16}$	135.94	$\frac{11}{16}$	170.99	$\frac{11}{16}$	210.05	$\frac{11}{16}$	253.13
$\frac{3}{4}$	136.63	$\frac{3}{4}$	171.77	$\frac{3}{4}$	210.91	$\frac{3}{4}$	254.07
$\frac{13}{16}$	137.32	$\frac{13}{16}$	172.54	$\frac{13}{16}$	211.77	$\frac{13}{16}$	255.01
$\frac{7}{8}$	138.02	$\frac{7}{8}$	173.32	$\frac{7}{8}$	212.63	$\frac{7}{8}$	255.96
$\frac{15}{16}$	138.71	$\frac{15}{16}$	174.09	$\frac{15}{16}$	213.49	$\frac{15}{16}$	256.90
0	139.41	0	174.87	0	214.35	0	257.85
$\frac{1}{16}$	140.10	$\frac{1}{16}$	175.65	$\frac{1}{16}$	215.22	$\frac{1}{16}$	258.79
$\frac{1}{8}$	140.81	$\frac{1}{8}$	176.44	$\frac{1}{8}$	216.09	$\frac{1}{8}$	259.75
$\frac{3}{16}$	141.51	$\frac{3}{16}$	177.22	$\frac{3}{16}$	216.95	$\frac{3}{16}$	260.70
$\frac{1}{4}$	142.21	$\frac{1}{4}$	178.01	$\frac{1}{4}$	217.83	$\frac{1}{4}$	261.66
$\frac{5}{16}$	142.92	$\frac{5}{16}$	178.80	$\frac{5}{16}$	218.70	$\frac{5}{16}$	262.61
$\frac{3}{8}$	143.62	$\frac{3}{8}$	179.59	$\frac{3}{8}$	219.57	$\frac{3}{8}$	263.57
$\frac{7}{16}$	144.33	$\frac{7}{16}$	180.38	$\frac{7}{16}$	220.44	$\frac{7}{16}$	264.52
$\frac{1}{2}$	145.04	$\frac{1}{2}$	181.18	$\frac{1}{2}$	221.32	$\frac{1}{2}$	265.49
$\frac{9}{16}$	145.75	$\frac{9}{16}$	181.97	$\frac{9}{16}$	222.20	$\frac{9}{16}$	266.45
$\frac{5}{8}$	146.47	$\frac{5}{8}$	182.77	$\frac{5}{8}$	223.08	$\frac{5}{8}$	267.42
$\frac{11}{16}$	147.18	$\frac{11}{16}$	183.57	$\frac{11}{16}$	223.97	$\frac{11}{16}$	268.38
$\frac{3}{4}$	147.90	$\frac{3}{4}$	184.37	$\frac{3}{4}$	224.85	$\frac{3}{4}$	269.35
$\frac{13}{16}$	148.62	$\frac{13}{16}$	185.17	$\frac{13}{16}$	225.74	$\frac{13}{16}$	270.32
$\frac{7}{8}$	149.34	$\frac{7}{8}$	185.97	$\frac{7}{8}$	226.63	$\frac{7}{8}$	271.29
$\frac{15}{16}$	150.06	$\frac{15}{16}$	186.78	$\frac{15}{16}$	227.51	$\frac{15}{16}$	272.27
0	150.78	0	187.59	0	228.41	0	273.24
$\frac{1}{16}$	151.51	$\frac{1}{16}$	188.39	$\frac{1}{16}$	229.30	$\frac{1}{16}$	274.21
$\frac{1}{8}$	152.24	$\frac{1}{8}$	189.21	$\frac{1}{8}$	230.19	$\frac{1}{8}$	275.20
$\frac{3}{16}$	152.97	$\frac{3}{16}$	190.02	$\frac{3}{16}$	231.09	$\frac{3}{16}$	276.18
$\frac{1}{4}$	153.70	$\frac{1}{4}$	190.84	$\frac{1}{4}$	231.99	$\frac{1}{4}$	277.16
$\frac{5}{16}$	154.43	$\frac{5}{16}$	191.65	$\frac{5}{16}$	232.89	$\frac{5}{16}$	278.14
$\frac{3}{8}$	155.17	$\frac{3}{8}$	192.47	$\frac{3}{8}$	233.79	$\frac{3}{8}$	279.13
$\frac{7}{16}$	155.90	$\frac{7}{16}$	193.29	$\frac{7}{16}$	234.69	$\frac{7}{16}$	280.11
$\frac{1}{2}$	156.64	$\frac{1}{2}$	194.11	$\frac{1}{2}$	235.60	$\frac{1}{2}$	281.10
$\frac{9}{16}$	157.38	$\frac{9}{16}$	194.93	$\frac{9}{16}$	236.50	$\frac{9}{16}$	282.09
$\frac{5}{8}$	158.12	$\frac{5}{8}$	195.76	$\frac{5}{8}$	237.42	$\frac{5}{8}$	283.09
$\frac{11}{16}$	158.86	$\frac{11}{16}$	196.59	$\frac{11}{16}$	238.33	$\frac{11}{16}$	284.08
$\frac{3}{4}$	159.61	$\frac{3}{4}$	197.42	$\frac{3}{4}$	239.24	$\frac{3}{4}$	285.08
$\frac{13}{16}$	160.36	$\frac{13}{16}$	198.25	$\frac{13}{16}$	240.15	$\frac{13}{16}$	286.07
$\frac{7}{8}$	161.10	$\frac{7}{8}$	199.08	$\frac{7}{8}$	241.07	$\frac{7}{8}$	287.07
$\frac{15}{16}$	161.85	$\frac{15}{16}$	199.91	$\frac{15}{16}$	241.99	$\frac{15}{16}$	288.07

For HIGH SPEED STEEL add 10 per cent.

ROUND STEEL—WEIGHT PER LINEAR INCH

Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.	Diam.	Lbs.
0	289.08	0	339.26	0	393.47	0	451.68
$\frac{1}{16}$	290.08	$\frac{1}{16}$	340.35	$\frac{1}{16}$	394.63	$\frac{1}{16}$	452.93
$\frac{1}{8}$	291.09	$\frac{1}{8}$	341.44	$\frac{1}{8}$	395.81	$\frac{1}{8}$	454.20
$\frac{3}{16}$	292.10	$\frac{3}{16}$	342.53	$\frac{3}{16}$	396.99	$\frac{3}{16}$	455.45
$\frac{1}{4}$	293.11	$\frac{1}{4}$	343.63	$\frac{1}{4}$	398.17	$\frac{1}{4}$	456.72
$\frac{5}{16}$	294.12	$\frac{5}{16}$	344.72	$\frac{5}{16}$	399.34	$\frac{5}{16}$	457.98
$\frac{3}{8}$	295.13	$\frac{3}{8}$	345.82	$\frac{3}{8}$	400.53	$\frac{3}{8}$	459.24
$\frac{7}{16}$	296.14	$\frac{7}{16}$	346.91	$\frac{7}{16}$	401.70	$\frac{7}{16}$	460.50
$\frac{1}{2}$	297.16	$\frac{1}{2}$	348.02	$\frac{1}{2}$	402.89	$\frac{1}{2}$	461.78
$\frac{9}{16}$	298.18	$\frac{9}{16}$	349.12	$\frac{9}{16}$	404.07	$\frac{9}{16}$	463.04
$\frac{5}{8}$	299.20	$\frac{5}{8}$	350.23	$\frac{5}{8}$	405.27	$\frac{5}{8}$	464.32
$\frac{11}{16}$	300.22	$\frac{11}{16}$	351.33	$\frac{11}{16}$	406.45	$\frac{11}{16}$	465.59
$\frac{3}{4}$	301.25	$\frac{3}{4}$	352.44	$\frac{3}{4}$	407.65	$\frac{3}{4}$	466.85
$\frac{13}{16}$	302.27	$\frac{13}{16}$	353.55	$\frac{13}{16}$	408.84	$\frac{13}{16}$	468.14
$\frac{7}{8}$	303.30	$\frac{7}{8}$	354.66	$\frac{7}{8}$	410.03	$\frac{7}{8}$	469.42
$\frac{15}{16}$	304.33	$\frac{15}{16}$	355.77	$\frac{15}{16}$	411.23	$\frac{15}{16}$	470.70
0	305.36	0	356.89	0	412.42	0	471.98
$\frac{1}{16}$	306.39	$\frac{1}{16}$	358.00	$\frac{1}{16}$	413.62	$\frac{1}{16}$	473.26
$\frac{1}{8}$	307.43	$\frac{1}{8}$	359.12	$\frac{1}{8}$	414.83	$\frac{1}{8}$	474.55
$\frac{3}{16}$	308.46	$\frac{3}{16}$	360.24	$\frac{3}{16}$	416.03	$\frac{3}{16}$	475.84
$\frac{1}{4}$	309.50	$\frac{1}{4}$	361.36	$\frac{1}{4}$	417.24	$\frac{1}{4}$	477.13
$\frac{5}{16}$	310.54	$\frac{5}{16}$	362.48	$\frac{5}{16}$	418.44	$\frac{5}{16}$	478.42
$\frac{3}{8}$	311.58	$\frac{3}{8}$	363.61	$\frac{3}{8}$	419.65	$\frac{3}{8}$	479.71
$\frac{7}{16}$	312.62	$\frac{7}{16}$	364.73	$\frac{7}{16}$	420.85	$\frac{7}{16}$	480.99
$\frac{1}{2}$	313.67	$\frac{1}{2}$	365.86	$\frac{1}{2}$	422.07	$\frac{1}{2}$	482.30
$\frac{9}{16}$	314.71	$\frac{9}{16}$	366.99	$\frac{9}{16}$	423.28	$\frac{9}{16}$	483.59
$\frac{5}{8}$	315.76	$\frac{5}{8}$	368.13	$\frac{5}{8}$	424.50	$\frac{5}{8}$	484.89
$\frac{11}{16}$	316.81	$\frac{11}{16}$	369.26	$\frac{11}{16}$	425.72	$\frac{11}{16}$	486.19
$\frac{3}{4}$	317.87	$\frac{3}{4}$	370.39	$\frac{3}{4}$	426.94	$\frac{3}{4}$	487.50
$\frac{13}{16}$	318.92	$\frac{13}{16}$	371.53	$\frac{13}{16}$	428.16	$\frac{13}{16}$	488.80
$\frac{7}{8}$	319.97	$\frac{7}{8}$	372.67	$\frac{7}{8}$	429.38	$\frac{7}{8}$	490.11
$\frac{15}{16}$	321.03	$\frac{15}{16}$	373.81	$\frac{15}{16}$	430.60	$\frac{15}{16}$	491.41
0	322.09	0	374.95	0	431.83	0	492.73
$\frac{1}{16}$	323.14	$\frac{1}{16}$	376.09	$\frac{1}{16}$	433.05	$\frac{1}{16}$	494.03
$\frac{1}{8}$	324.21	$\frac{1}{8}$	377.24	$\frac{1}{8}$	434.29	$\frac{1}{8}$	495.35
$\frac{3}{16}$	325.27	$\frac{3}{16}$	378.39	$\frac{3}{16}$	435.52	$\frac{3}{16}$	496.66
$\frac{1}{4}$	326.34	$\frac{1}{4}$	379.54	$\frac{1}{4}$	436.75	$\frac{1}{4}$	497.98
$\frac{5}{16}$	327.41	$\frac{5}{16}$	380.69	$\frac{5}{16}$	437.99	$\frac{5}{16}$	499.30
$\frac{3}{8}$	328.48	$\frac{3}{8}$	381.84	$\frac{3}{8}$	439.22	$\frac{3}{8}$	500.62
$\frac{7}{16}$	329.54	$\frac{7}{16}$	382.99	$\frac{7}{16}$	440.45	$\frac{7}{16}$	501.93
$\frac{1}{2}$	330.62	$\frac{1}{2}$	384.15	$\frac{1}{2}$	441.70	$\frac{1}{2}$	503.26
$\frac{9}{16}$	331.69	$\frac{9}{16}$	385.31	$\frac{9}{16}$	442.94	$\frac{9}{16}$	504.58
$\frac{5}{8}$	332.77	$\frac{5}{8}$	386.47	$\frac{5}{8}$	444.19	$\frac{5}{8}$	505.92
$\frac{11}{16}$	333.85	$\frac{11}{16}$	387.63	$\frac{11}{16}$	445.43	$\frac{11}{16}$	507.24
$\frac{3}{4}$	334.93	$\frac{3}{4}$	388.80	$\frac{3}{4}$	446.68	$\frac{3}{4}$	508.58
$\frac{13}{16}$	336.01	$\frac{13}{16}$	389.96	$\frac{13}{16}$	447.93	$\frac{13}{16}$	509.91
$\frac{7}{8}$	337.09	$\frac{7}{8}$	391.13	$\frac{7}{8}$	449.18	$\frac{7}{8}$	511.24
$\frac{15}{16}$	338.18	$\frac{15}{16}$	392.29	$\frac{15}{16}$	450.43	$\frac{15}{16}$	512.58
						48 0	513.91

For HIGH SPEED STEEL add 10 per cent^a

ROUND BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
$\frac{1}{8}$	.0417	$\frac{43}{64}$	1.2054	$\frac{15}{32}$	5.7606	$\frac{17}{32}$	17.1096
$\frac{9}{64}$	.0528	$\frac{11}{16}$	1.2622	$\frac{1}{2}$	6.0083	$\frac{9}{16}$	17.5346
$\frac{5}{32}$	.0652	$\frac{45}{64}$	1.3202	$\frac{17}{32}$	6.2612	$\frac{19}{32}$	17.9650
$\frac{11}{64}$	.0789	$\frac{23}{32}$	1.3795	$\frac{9}{16}$	6.5194	$\frac{5}{8}$	18.4004
$\frac{3}{16}$	.0939	$\frac{47}{64}$	1.4401	$\frac{19}{32}$	6.7828	$\frac{21}{32}$	18.8410
$\frac{13}{64}$	.1102	$\frac{3}{4}$	1.5021	$\frac{5}{8}$	7.0514	$\frac{11}{16}$	19.2870
$\frac{7}{32}$	.1278	$\frac{49}{64}$	1.5653	$\frac{21}{32}$	7.3252	$\frac{23}{32}$	19.7382
$\frac{15}{64}$	.1467	$\frac{25}{32}$	1.6299	$\frac{11}{16}$	7.6043	$\frac{3}{4}$	20.1946
$\frac{1}{4}$	.1669	$\frac{31}{32}$	1.6957	$\frac{16}{32}$	7.8885	$\frac{25}{32}$	20.656
$\frac{17}{64}$	.1884	$\frac{13}{16}$	1.7629	$\frac{3}{4}$	8.1780	$\frac{13}{16}$	21.123
$\frac{9}{32}$	.2112	0 $\frac{53}{64}$	1.8313	$\frac{25}{32}$	8.4726	$\frac{27}{32}$	21.595
$\frac{19}{64}$	.2354	$\frac{27}{32}$	1.9011	$\frac{13}{16}$	8.7725	$\frac{7}{8}$	22.072
$\frac{5}{16}$	.2608	$\frac{55}{64}$	1.9721	$\frac{16}{32}$	9.0776	$\frac{29}{32}$	22.555
$\frac{21}{64}$	.2875	$\frac{7}{8}$	2.0445	$\frac{7}{8}$	9.3880	$\frac{15}{16}$	23.042
$\frac{11}{32}$	.3155	$\frac{57}{64}$	2.1182	$\frac{29}{32}$	9.7035	$\frac{31}{32}$	23.535
$\frac{23}{64}$	.3449	$\frac{29}{32}$	2.1931	$\frac{15}{16}$	10.0243	0	24.033
$\frac{3}{8}$	.3755	$\frac{59}{64}$	2.2694	$\frac{31}{32}$	10.3502	$\frac{1}{32}$	24.537
$\frac{25}{64}$	.4075	$\frac{15}{16}$	2.3470	0	10.6814	$\frac{1}{16}$	25.045
$\frac{6}{32}$	.4407	$\frac{61}{64}$	2.4259	$\frac{1}{32}$	11.0178	$\frac{3}{32}$	25.559
$\frac{27}{64}$	.4753	$\frac{64}{64}$	2.5061	$\frac{1}{16}$	11.3595	$\frac{1}{8}$	26.078
$\frac{7}{16}$	.5111	$\frac{63}{64}$	2.5876	$\frac{3}{32}$	11.7063	$\frac{5}{32}$	26.602
$\frac{29}{64}$	.5483	0	2.6704	$\frac{1}{8}$	12.0583	$\frac{3}{16}$	27.131
$\frac{15}{32}$	.5867	$\frac{1}{32}$	2.8399	$\frac{5}{32}$	12.4156	$\frac{7}{32}$	27.666
$\frac{31}{64}$	.6265	$\frac{1}{16}$	3.0146	$\frac{3}{16}$	12.7781	$\frac{1}{4}$	28.206
$\frac{1}{2}$	.6676	$\frac{3}{32}$	3.1945	$\frac{7}{32}$	13.1458	$\frac{9}{32}$	28.751
$\frac{33}{64}$	.7100	$\frac{1}{8}$	3.3797	$\frac{1}{4}$	13.5187	3 $\frac{5}{16}$	29.301
$\frac{17}{32}$	.7536	$\frac{5}{32}$	3.5700	$\frac{9}{32}$	13.8968	$\frac{11}{32}$	29.856
$\frac{35}{64}$	.7986	$\frac{3}{16}$	3.7656	2 $\frac{5}{16}$	14.2802	$\frac{3}{8}$	30.417
$\frac{9}{16}$	.8449	1 $\frac{7}{32}$	3.9664	$\frac{11}{16}$	14.6687	$\frac{13}{32}$	30.983
$\frac{37}{64}$	.8925	$\frac{1}{4}$	4.1724	$\frac{13}{32}$	15.0625	$\frac{7}{16}$	31.554
$\frac{19}{32}$	.9414	$\frac{9}{32}$	4.3836	$\frac{3}{8}$	15.4615	$\frac{15}{32}$	32.130
$\frac{39}{64}$	.9916	$\frac{5}{16}$	4.6001	$\frac{7}{16}$	15.8657	$\frac{1}{2}$	32.712
$\frac{5}{8}$	1.0431	$\frac{11}{16}$	4.8218	$\frac{1}{2}$	16.2751	$\frac{9}{16}$	33.891
$\frac{41}{64}$	1.0959	$\frac{3}{8}$	5.0486	$\frac{15}{32}$	16.6898	$\frac{5}{8}$	35.090
$\frac{21}{32}$	1.1500	$\frac{13}{32}$	5.2807	$\frac{1}{2}$		$\frac{11}{16}$	36.311
$\frac{43}{64}$		$\frac{7}{16}$	5.5180				

For HIGH SPEED STEEL add 10 per cent.

ROUND BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Size, Inches	Weight, Pounds	Size Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
3	$\frac{3}{4}$ 37.552	0 96.13	$\frac{3}{16}$ 179.01	$\frac{5}{16}$ 284.0			
	$\frac{13}{16}$ 38.814	$\frac{1}{16}$ 98.15	$\frac{1}{4}$ 181.75	$\frac{3}{8}$ 287.4			
	$\frac{7}{8}$ 40.097	$\frac{1}{8}$ 100.18	$\frac{5}{16}$ 184.52	$\frac{7}{16}$ 290.9			
	$\frac{15}{16}$ 41.401	$\frac{3}{16}$ 102.24	$\frac{3}{8}$ 187.30	$\frac{1}{2}$ 294.4			
		$\frac{1}{4}$ 104.31	$\frac{7}{16}$ 190.11	$\frac{9}{16}$ 297.9			
4	0 42.726	6	$\frac{5}{16}$ 106.41	8	$\frac{1}{2}$ 192.93	10	$\frac{5}{8}$ 301.5
	$\frac{1}{16}$ 44.071		$\frac{3}{8}$ 108.53		$\frac{9}{16}$ 195.78		$\frac{11}{16}$ 305.0
	$\frac{1}{8}$ 45.438		$\frac{7}{16}$ 110.66		$\frac{5}{8}$ 198.65		$\frac{3}{4}$ 308.6
	$\frac{3}{16}$ 46.825		$\frac{1}{2}$ 112.82		$\frac{11}{16}$ 201.54		$\frac{13}{16}$ 312.2
	$\frac{1}{4}$ 48.233		$\frac{9}{16}$ 115.00		$\frac{3}{4}$ 204.45		$\frac{7}{8}$ 315.8
	$\frac{5}{16}$ 49.662	7	$\frac{5}{8}$ 117.20	9	$\frac{13}{16}$ 207.38	11	$\frac{15}{16}$ 319.5
	$\frac{3}{8}$ 51.112		$\frac{11}{16}$ 119.43		$\frac{7}{8}$ 210.33		0
	$\frac{7}{16}$ 52.583		$\frac{3}{4}$ 121.67		$\frac{15}{16}$ 213.31		$\frac{1}{16}$ 323.1
	$\frac{1}{2}$ 54.075		$\frac{13}{16}$ 123.93		0 216.3		$\frac{1}{8}$ 326.8
	$\frac{9}{16}$ 55.587		$\frac{7}{8}$ 126.22		$\frac{1}{16}$ 219.3		$\frac{3}{16}$ 330.5
$\frac{5}{8}$ 57.121	8	$\frac{15}{16}$ 128.52	10	$\frac{1}{8}$ 222.4	12	$\frac{1}{4}$ 334.2	
$\frac{11}{16}$ 58.675		$\frac{3}{16}$ 130.85		$\frac{3}{16}$ 225.4		$\frac{5}{16}$ 341.7	
$\frac{3}{8}$ 60.250		$\frac{1}{4}$ 133.19		$\frac{1}{4}$ 228.5		$\frac{3}{8}$ 345.5	
$\frac{13}{16}$ 61.846		$\frac{5}{16}$ 135.56		$\frac{7}{16}$ 231.6		$\frac{7}{16}$ 349.3	
$\frac{7}{8}$ 63.463		$\frac{3}{8}$ 137.95		$\frac{3}{8}$ 234.7		$\frac{1}{2}$ 353.1	
$\frac{15}{16}$ 65.100	$\frac{1}{4}$ 140.36	$\frac{7}{16}$ 237.8	$\frac{9}{16}$ 244.2	$\frac{5}{8}$ 360.9			
5	0 66.759	7	$\frac{1}{2}$ 142.79	9	$\frac{1}{2}$ 241.0	11	$\frac{5}{8}$ 364.8
	$\frac{1}{16}$ 68.438		$\frac{9}{16}$ 145.24		$\frac{9}{16}$ 244.2		$\frac{11}{16}$ 368.7
	$\frac{1}{8}$ 70.139		$\frac{7}{16}$ 147.71		$\frac{5}{8}$ 247.4		$\frac{3}{4}$ 372.6
	$\frac{3}{16}$ 71.860		$\frac{1}{2}$ 150.21		$\frac{11}{16}$ 250.6		$\frac{13}{16}$ 376.6
	$\frac{1}{4}$ 73.602		$\frac{9}{16}$ 152.72		$\frac{3}{4}$ 253.9		$\frac{7}{8}$ 380.5
	$\frac{5}{16}$ 75.364	8	$\frac{11}{16}$ 155.26	10	$\frac{13}{16}$ 257.1	12	....
	$\frac{3}{8}$ 77.148		$\frac{1}{2}$ 157.81		$\frac{7}{8}$ 260.4		....
	$\frac{7}{16}$ 78.953		$\frac{3}{4}$ 160.39		$\frac{15}{16}$ 263.7		....
	$\frac{1}{2}$ 80.778		$\frac{13}{16}$ 162.99		0 267.0		....
	$\frac{9}{16}$ 82.62		$\frac{7}{8}$ 165.60		$\frac{1}{16}$ 270.4		....
	$\frac{5}{8}$ 84.49	9	$\frac{15}{16}$ 168.24	11	$\frac{1}{8}$ 273.8	13	....
$\frac{11}{16}$ 86.38	$\frac{1}{2}$ 170.90		$\frac{3}{16}$ 277.1		....		
$\frac{3}{4}$ 88.29	$\frac{1}{4}$ 173.58		$\frac{1}{4}$ 280.6		....		
$\frac{13}{16}$ 90.22	$\frac{3}{8}$ 176.29				....		
$\frac{7}{8}$ 92.17					....		
$\frac{15}{16}$ 94.14							

For HIGH SPEED STEEL add 10 per cent.

SQUARE BAR STEEL

WEIGHT PER LINEAR FOOT, POUNDS

Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
$\frac{1}{8}$	.0531	$\frac{43}{64}$	1.5348	$\frac{15}{32}$	7.335	$\frac{17}{32}$	21.785
$\frac{9}{64}$	.0672	$\frac{11}{16}$	1.6070	$\frac{1}{2}$	7.650	$\frac{9}{16}$	22.326
$\frac{3}{32}$	.0830	$\frac{45}{64}$	1.6809	$\frac{17}{32}$	7.972	$\frac{19}{32}$	22.874
$\frac{11}{64}$	.1004	$\frac{23}{32}$	1.7564	$\frac{9}{16}$	8.301	$\frac{5}{8}$	23.428
$\frac{3}{16}$	.1195	$\frac{47}{64}$	1.8336	$\frac{19}{32}$	8.636	$\frac{21}{32}$	23.989
$\frac{13}{64}$	.1403	$\frac{3}{4}$	1.9125	$\frac{5}{8}$	8.978	$\frac{11}{16}$	24.557
$\frac{7}{32}$	.1627	$\frac{49}{64}$	1.9930	$\frac{21}{32}$	9.327	$\frac{23}{32}$	25.131
$\frac{15}{64}$	.1868	$\frac{25}{32}$	2.0752	$\frac{11}{16}$	9.682	$\frac{3}{4}$	25.713
$\frac{1}{4}$	.2125	$\frac{51}{64}$	2.1590	$\frac{13}{32}$	10.044	$\frac{25}{32}$	26.300
$\frac{17}{64}$	.2399	$\frac{13}{16}$	2.2445	$\frac{3}{4}$	10.413	$\frac{13}{16}$	26.895
$\frac{9}{32}$	.2689	0 $\frac{53}{64}$	2.3317	$\frac{25}{32}$	10.788	$\frac{27}{32}$	27.496
$\frac{19}{64}$	.2997	$\frac{27}{32}$	2.4205	$\frac{13}{16}$	11.170	$\frac{3}{8}$	28.103
$\frac{5}{16}$	.3320	$\frac{55}{64}$	2.5110	$\frac{27}{32}$	11.558	$\frac{29}{32}$	28.717
$\frac{21}{64}$	.3661	$\frac{7}{8}$	2.6031	$\frac{7}{8}$	11.953	$\frac{15}{16}$	29.338
$\frac{11}{32}$	.4018	$\frac{57}{64}$	2.6969	$\frac{29}{32}$	12.355	$\frac{17}{32}$	29.966
$\frac{23}{64}$	.4391	$\frac{29}{32}$	2.7924	$\frac{15}{16}$	12.763	0	30.600
$\frac{3}{8}$	.4781	$\frac{59}{64}$	2.8895	$\frac{31}{32}$	13.178	$\frac{1}{32}$	31.241
$\frac{25}{64}$	.5188	$\frac{15}{16}$	2.9883	0	13.600	$\frac{1}{16}$	31.888
$\frac{13}{32}$	.5611	$\frac{61}{64}$	3.0887	$\frac{1}{32}$	14.028	$\frac{3}{32}$	32.542
$\frac{27}{64}$	.6051	$\frac{31}{32}$	3.1908	$\frac{1}{16}$	14.463	$\frac{1}{8}$	33.203
$\frac{63}{64}$	.6508	$\frac{63}{64}$	3.2946	$\frac{3}{32}$	14.905	$\frac{5}{32}$	33.871
$\frac{7}{16}$	.6981	0	3.400	$\frac{1}{8}$	15.353	$\frac{3}{16}$	34.545
$\frac{29}{64}$	.7471	$\frac{1}{32}$	3.616	$\frac{5}{32}$	15.808	$\frac{7}{32}$	35.225
$\frac{15}{32}$	.7977	$\frac{1}{16}$	3.838	$\frac{3}{16}$	16.270	$\frac{1}{4}$	35.913
$\frac{31}{64}$	.8500	$\frac{3}{32}$	4.067	$\frac{7}{32}$	16.738	$\frac{9}{32}$	36.606
$\frac{1}{2}$		$\frac{1}{8}$	4.303	$\frac{1}{4}$	17.213	3	37.307
$\frac{33}{64}$	.9040	$\frac{5}{32}$	4.546	$\frac{3}{16}$	17.694	$\frac{5}{16}$	38.014
$\frac{17}{32}$	.9596	$\frac{3}{16}$	4.795	$\frac{1}{2}$		$\frac{11}{32}$	38.728
$\frac{35}{64}$	1.0168	$\frac{7}{16}$	5.050	$\frac{5}{16}$	18.182	$\frac{3}{8}$	39.449
$\frac{9}{16}$	1.0758	$\frac{1}{4}$	5.313	$\frac{1}{2}$	18.677	$\frac{13}{32}$	40.176
$\frac{37}{64}$	1.1364	$\frac{9}{32}$	5.581	$\frac{3}{8}$	19.178	$\frac{7}{16}$	40.910
$\frac{19}{32}$	1.1986	$\frac{5}{16}$	5.857	$\frac{13}{32}$	19.686	$\frac{15}{32}$	41.650
$\frac{39}{64}$	1.2625	$\frac{11}{32}$	6.139	$\frac{7}{16}$	20.201	$\frac{1}{2}$	43.151
$\frac{41}{64}$	1.3281	$\frac{3}{8}$	6.428	$\frac{15}{32}$	20.722	$\frac{9}{16}$	44.678
$\frac{43}{64}$	1.3954	$\frac{13}{32}$	6.724	$\frac{1}{2}$	21.250	$\frac{5}{8}$	46.232
$\frac{21}{32}$	1.4643	$\frac{7}{16}$	7.026			$\frac{11}{16}$	

For HIGH SPEED STEEL add 10 per cent.

SQUARE BAR STEEL

WEIGHT PER LINEAR FOOT, POUNDS

Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
$\frac{3}{4}$	47.813	0	122.40	$\frac{3}{16}$	227.92	$\frac{5}{16}$	361.6
$\frac{13}{16}$	49.420	$\frac{1}{16}$	124.96	$\frac{1}{4}$	231.41	$\frac{3}{8}$	366.0
$\frac{7}{8}$	51.053	$\frac{1}{8}$	127.55	$\frac{5}{16}$	234.93	$\frac{7}{16}$	370.4
$\frac{15}{16}$	52.713	$\frac{3}{16}$	130.17	$\frac{3}{8}$	238.48	$\frac{1}{2}$	374.9
3		$\frac{1}{4}$	132.81	$\frac{7}{16}$	242.05	$\frac{9}{16}$	379.3
0	54.400						
$\frac{1}{16}$	56.113	$\frac{5}{16}$	135.48	$\frac{1}{2}$	245.65	10 $\frac{5}{8}$	383.8
$\frac{1}{8}$	57.853	$\frac{3}{8}$	138.18	8 $\frac{9}{16}$	249.28	$\frac{11}{16}$	388.4
$\frac{3}{16}$	59.620	$\frac{7}{16}$	140.90	$\frac{5}{8}$	252.93	$\frac{3}{4}$	392.9
$\frac{1}{4}$	61.413	6 $\frac{1}{2}$	143.65	$\frac{11}{16}$	256.61	$\frac{13}{16}$	397.5
		$\frac{9}{16}$	146.43	$\frac{3}{4}$	260.31	$\frac{7}{8}$	402.1
$\frac{5}{16}$	63.232	$\frac{5}{8}$	149.23			$\frac{15}{16}$	406.7
$\frac{3}{8}$	65.078	$\frac{11}{16}$	152.06	$\frac{13}{16}$	264.04		
$\frac{7}{16}$	66.951	$\frac{3}{4}$	154.91	$\frac{7}{8}$	267.80	0	411.4
$\frac{1}{2}$	68.850	$\frac{13}{16}$	157.79	$\frac{15}{16}$	271.59	$\frac{1}{16}$	416.1
$\frac{9}{16}$	70.776	$\frac{7}{8}$	160.70			$\frac{1}{8}$	420.8
$\frac{5}{8}$	72.728	$\frac{15}{16}$	163.64	0	275.4	$\frac{3}{16}$	425.5
$\frac{11}{16}$	74.707			$\frac{1}{16}$	279.2	$\frac{1}{4}$	430.3
$\frac{3}{4}$	76.713	0	166.60	$\frac{1}{8}$	283.1		
$\frac{7}{8}$	78.745	$\frac{1}{16}$	169.59	$\frac{3}{16}$	287.0	$\frac{5}{16}$	435.1
$\frac{15}{16}$	80.803	$\frac{1}{8}$	172.60	$\frac{1}{4}$	290.9	$\frac{3}{8}$	439.9
		$\frac{3}{16}$	175.64			$\frac{7}{16}$	444.8
		$\frac{1}{4}$	178.71	$\frac{5}{16}$	294.9	$\frac{1}{2}$	449.6
		0	166.60	$\frac{3}{8}$	298.8	$\frac{9}{16}$	454.6
0	85.000	$\frac{1}{16}$	169.59	$\frac{7}{16}$	302.8		
$\frac{1}{16}$	87.138	$\frac{1}{8}$	172.60	$\frac{1}{2}$	306.8	$\frac{5}{8}$	459.5
$\frac{1}{8}$	89.303	$\frac{3}{16}$	175.64	$\frac{9}{16}$	310.9	$\frac{11}{16}$	464.4
$\frac{3}{16}$	91.495	$\frac{1}{4}$	178.71			$\frac{3}{4}$	469.4
$\frac{1}{4}$	93.713			9 $\frac{5}{8}$	315.0	$\frac{13}{16}$	474.4
$\frac{5}{16}$	95.957	7 $\frac{9}{16}$	194.45	$\frac{11}{16}$	319.1	$\frac{7}{8}$	479.5
$\frac{3}{8}$	98.228	$\frac{5}{8}$	197.68	$\frac{3}{4}$	323.2		
$\frac{7}{16}$	100.53	$\frac{11}{16}$	200.93	$\frac{13}{16}$	327.4	$\frac{15}{16}$	484.5
$\frac{1}{2}$	102.85	$\frac{3}{4}$	204.21	$\frac{7}{8}$	331.6		
$\frac{9}{16}$	105.20	$\frac{15}{16}$	207.52			12	489.6
$\frac{5}{8}$	107.58	$\frac{7}{8}$	210.85	$\frac{15}{16}$	335.8	....	....
$\frac{11}{16}$	109.98					....	....
$\frac{3}{4}$	112.41	$\frac{15}{16}$	214.21	0	340.0	....	....
$\frac{13}{16}$	114.87	0	217.60	$\frac{1}{16}$	344.3	....	....
$\frac{7}{8}$	117.35	8 $\frac{1}{16}$	221.01	$\frac{1}{8}$	348.5	....	....
		$\frac{1}{8}$	224.45	$\frac{3}{16}$	352.9	....	....
$\frac{15}{16}$	119.86			$\frac{1}{4}$	357.2	....	....

For HIGH SPEED STEEL add 10 per cent.

HEXAGON AND OCTAGON BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

HEXAGON				OCTAGON			
Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds	Size, Inches	Weight, Pounds
$\frac{3}{16}$	.104	0	26.500	$\frac{3}{16}$	.099	0	25.350
$\frac{1}{4}$	.184	$\frac{1}{8}$	28.755	$\frac{1}{4}$	.176	$\frac{1}{8}$	27.506
$\frac{5}{16}$	.287	$\frac{1}{4}$	31.101	$\frac{5}{16}$	.275	$\frac{1}{4}$	29.751
$\frac{3}{8}$	.414	$\frac{3}{8}$	33.540	$\frac{3}{8}$	.396	$\frac{3}{8}$	32.084
$\frac{7}{16}$	.564	3 $\frac{1}{2}$	36.070	$\frac{7}{16}$	.539	3 $\frac{1}{2}$	34.504
$\frac{1}{2}$	.736	$\frac{5}{8}$	38.692	$\frac{1}{2}$	.704	$\frac{5}{8}$	37.013
0 $\frac{9}{16}$	.932	$\frac{3}{4}$	41.407	0 $\frac{9}{16}$	.891	$\frac{3}{4}$	39.609
$\frac{5}{8}$	1.150	$\frac{7}{8}$	44.213	$\frac{5}{8}$	1.100	$\frac{7}{8}$	42.294
$\frac{11}{16}$	1.392			$\frac{11}{16}$	1.331		
$\frac{3}{4}$	1.656	0	47.112	$\frac{3}{4}$	1.584	0	45.067
$\frac{13}{16}$	1.944	$\frac{1}{8}$	50.102	$\frac{13}{16}$	1.859	$\frac{1}{8}$	47.927
$\frac{7}{8}$	2.254	$\frac{1}{4}$	53.185	$\frac{7}{8}$	2.157	$\frac{1}{4}$	50.876
$\frac{15}{16}$	2.588	$\frac{3}{8}$	56.359	$\frac{15}{16}$	2.476	$\frac{3}{8}$	53.912
		4 $\frac{1}{2}$	59.626			4 $\frac{1}{2}$	57.037
0	2.945			0	2.817		
$\frac{1}{16}$	3.324	$\frac{5}{8}$	62.984	$\frac{1}{16}$	3.180	$\frac{5}{8}$	60.250
$\frac{1}{8}$	3.727	$\frac{3}{4}$	66.435	$\frac{1}{8}$	3.565	$\frac{3}{4}$	63.551
$\frac{3}{16}$	4.152			$\frac{3}{16}$	3.972		
$\frac{1}{4}$	4.601	0	73.612	$\frac{1}{4}$	4.401	0	70.016
$\frac{5}{16}$	5.072	5 $\frac{1}{4}$	81.157	$\frac{5}{16}$	4.852	5 $\frac{1}{4}$	77.634
$\frac{3}{8}$	5.567	$\frac{1}{2}$	89.071	$\frac{3}{8}$	5.325	$\frac{1}{2}$	85.204
$\frac{7}{16}$	6.085	$\frac{3}{4}$	97.352	$\frac{7}{16}$	5.820	$\frac{3}{4}$	93.126
1 $\frac{1}{2}$	6.625			1 $\frac{1}{2}$	6.338		
$\frac{9}{16}$	7.189	6 0	106.001	$\frac{9}{16}$	6.877	6 0	101.399
$\frac{5}{8}$	7.775	6 $\frac{1}{2}$	124.404	$\frac{5}{8}$	7.438	6 $\frac{1}{2}$	119.004
$\frac{11}{16}$	8.385			$\frac{11}{16}$	8.021		
$\frac{3}{4}$	9.018	7 0	144.280	$\frac{3}{4}$	8.626	7 0	138.016
$\frac{13}{16}$	9.673	7 $\frac{1}{2}$	165.627	$\frac{13}{16}$	9.253	7 $\frac{1}{2}$	158.437
$\frac{7}{8}$	10.352	8 0	188.447	$\frac{7}{8}$	9.902	8 0	180.266
$\frac{15}{16}$	11.053	8 $\frac{1}{2}$	212.739	$\frac{15}{16}$	10.574	8 $\frac{1}{2}$	203.503
0	11.778			0	11.267		
$\frac{1}{8}$	13.296	9 0	238.503	$\frac{1}{8}$	12.719	9 0	228.149
$\frac{1}{4}$	14.907	9 $\frac{1}{2}$	265.740	$\frac{1}{4}$	14.259	9 $\frac{1}{2}$	254.203
$\frac{3}{8}$	16.609			$\frac{3}{8}$	15.888		
2 $\frac{1}{2}$	18.403	10	294.449	$\frac{1}{2}$	17.604	10	281.665
$\frac{5}{8}$	20.289			$\frac{5}{8}$	19.409		
$\frac{3}{4}$	22.268	11	356.283	$\frac{3}{4}$	21.301	11	340.815
$\frac{7}{8}$	24.338	12	424.006	$\frac{7}{8}$	23.281	12	405.598

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$\frac{3}{8}$	$\frac{13}{32}$	$\frac{7}{16}$	$\frac{15}{32}$	$\frac{1}{2}$	$\frac{17}{32}$	$\frac{9}{16}$
$\frac{1}{32}$	.0398	.0432	.0465	.0498	.0531	.0564	.0598
$\frac{1}{16}$	.0797	.0863	.0930	.0996	.1063	.1129	.1195
$\frac{3}{32}$	.1195	.1295	.1395	.1494	.1594	.1693	.1793
$\frac{1}{8}$	.1594	.1727	.1859	.1992	.2125	.2258	.2391
$\frac{5}{32}$	.1992	.2158	.2324	.2490	.2656	.2822	.2988
$\frac{3}{16}$	.2391	.2590	.2789	.2988	.3188	.3387	.3586
$\frac{7}{32}$	.2789	.3021	.3254	.3486	.3719	.3951	.4184
$\frac{1}{4}$	.3188	.3453	.3719	.3984	.4250	.4516	.4781
$\frac{5}{16}$	.3984	.4316	.4648	.4980	.5313	.5645	.5977
$\frac{3}{8}$	.4781	.5180	.5578	.5977	.6375	.6773	.7172
$\frac{7}{16}$	.5578	.6043	.6508	.6973	.7438	.7902	.8367
$\frac{1}{2}$	.6375	.6906	.7438	.7969	.8500	.9031	.9563
$\frac{9}{16}$	.7172	.7770	.8367	.8965	.9563	1.0160	1.0758
$\frac{5}{8}$	.7969	.8633	.9297	.9961	1.0625	1.1289	1.1953
$\frac{11}{16}$	.8766	.9496	1.0227	1.0957	1.1688	1.2418	1.3148
$\frac{3}{4}$	.9563	1.0359	1.1156	1.1953	1.2750	1.3547	1.4344
$\frac{13}{16}$	1.0359	1.1223	1.2086	1.2949	1.3813	1.4676	1.5539
$\frac{7}{8}$	1.1156	1.2086	1.3016	1.3945	1.4875	1.5805	1.6734
$\frac{15}{16}$	1.1953	1.2949	1.3945	1.4941	1.5938	1.6934	1.7930
0	1.2750	1.3813	1.4875	1.5938	1.7000	1.8063	1.9125
$\frac{1}{8}$	1.4344	1.5539	1.6734	1.7930	1.9125	2.0320	2.1516
$\frac{1}{4}$	1.5938	1.7266	1.8594	1.9922	2.1250	2.2578	2.3906
$\frac{3}{8}$	1.7531	1.8992	2.0453	2.1914	2.3375	2.4836	2.6297
$\frac{1}{2}$	1.9125	2.0719	2.2313	2.3906	2.5500	2.7094	2.8688
$\frac{5}{8}$	2.0719	2.2445	2.4172	2.5898	2.7625	2.9352	3.1078
$\frac{3}{4}$	2.2313	2.4172	2.6031	2.7891	2.9750	3.1609	3.3469
$\frac{7}{8}$	2.3906	2.5898	2.7891	2.9883	3.1875	3.3867	3.5859
0	2.5500	2.7625	2.9750	3.1875	3.4000	3.6125	3.8250
$\frac{1}{8}$	2.7094	2.9352	3.1609	3.3867	3.6125	3.8383	4.0641
$\frac{1}{4}$	2.8688	3.1078	3.3469	3.5859	3.8250	4.0641	4.3031

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness Inches	WIDTH, INCHES						
	$\frac{1}{32}$	$\frac{5}{8}$	$\frac{21}{32}$	$\frac{11}{16}$	$\frac{23}{32}$	$\frac{3}{4}$	$\frac{25}{32}$
$\frac{1}{32}$	.0631	.0664	.0697	.0730	.0764	.0797	.0830
$\frac{1}{16}$	.1262	.1328	.1395	.1461	.1527	.1594	.1660
$\frac{3}{32}$	.1893	.1992	.2092	.2191	.2291	.2391	.2490
$\frac{1}{8}$	.2523	.2656	.2789	.2922	.3055	.3188	.3320
$\frac{5}{32}$	.3154	.3320	.3486	.3652	.3818	.3984	.4150
$\frac{3}{16}$	.3785	.3984	.4184	.4383	.4582	.4781	.4980
$\frac{7}{32}$	.4416	.4648	.4881	.5113	.5346	.5578	.5811
$\frac{1}{4}$	.5047	.5313	.5578	.5844	.6109	.6375	.6641
$\frac{5}{16}$	.6309	.6641	.6973	.7305	.7637	.7969	.8301
$\frac{3}{8}$	.7570	.7969	.8367	.8766	.9164	.9563	.9961
$\frac{7}{16}$	.8832	.9297	.9762	1.0227	1.0691	1.1156	1.1621
$\frac{1}{2}$	1.0094	1.0625	1.1156	1.1688	1.2219	1.2750	1.3281
$\frac{9}{16}$	1.1355	1.1953	1.2551	1.3148	1.3746	1.4344	1.4941
$\frac{5}{8}$	1.2617	1.3281	1.3945	1.4609	1.5273	1.5938	1.6602
$\frac{11}{16}$	1.3879	1.4609	1.5340	1.6070	1.6801	1.7531	1.8262
$\frac{3}{4}$	1.5141	1.5938	1.6734	1.7531	1.8328	1.9125	1.9922
$\frac{13}{16}$	1.6402	1.7266	1.8129	1.8992	1.9855	2.0719	2.1582
$\frac{7}{8}$	1.7664	1.8594	1.9523	2.0453	2.1383	2.2313	2.3242
$\frac{15}{16}$	1.8926	1.9922	2.0918	2.1914	2.2910	2.3906	2.4902
0	2.0188	2.1250	2.2313	2.3375	2.4438	2.5500	2.6563
$\frac{1}{8}$	2.2711	2.3906	2.5102	2.6297	2.7492	2.8688	2.9883
$\frac{1}{4}$	2.5234	2.6563	2.7891	2.9219	3.0547	3.1875	3.3203
$\frac{3}{8}$	2.7758	2.9219	3.0680	3.2141	3.3602	3.5063	3.6523
$\frac{1}{2}$	3.0281	3.1875	3.3469	3.5063	3.6656	3.8250	3.9844
$\frac{5}{8}$	3.2805	3.4531	3.6258	3.7984	3.9711	4.1438	4.3164
$\frac{3}{4}$	3.5328	3.7188	3.9047	4.0906	4.2766	4.4625	4.6484
$\frac{7}{8}$	3.7852	3.9844	4.1836	4.3828	4.5820	4.7813	4.9805
0	4.0375	4.2500	4.4625	4.6750	4.8875	5.1000	5.3125
$\frac{1}{8}$	4.2898	4.5156	4.7414	4.9672	5.1930	5.4188	5.6445
$\frac{1}{4}$	4.5422	4.7813	5.0203	5.2594	5.4984	5.7375	5.9766

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$\frac{13}{16}$	$\frac{27}{32}$	$\frac{7}{8}$	$\frac{29}{32}$	$\frac{15}{16}$	$\frac{31}{32}$	1
$\frac{1}{32}$	.0863	.0896	.0930	.0963	.0996	.1029	.1063
$\frac{1}{16}$	.1727	.1793	.1859	.1926	.1992	.2059	.2125
$\frac{3}{32}$	.2590	.2689	.2789	.2889	.2988	.3088	.3188
$\frac{1}{8}$	.3453	.3586	.3719	.3852	.3984	.4117	.4250
$\frac{5}{32}$	.4316	.4482	.4648	.4814	.4980	.5146	.5313
$\frac{3}{16}$	.5180	.5379	.5578	.5777	.5977	.6176	.6375
$\frac{7}{32}$	.6043	.6275	.6508	.6740	.6973	.7205	.7438
$\frac{1}{4}$	.6906	.7172	.7438	.7703	.7969	.8234	.8500
$\frac{5}{16}$	.8633	.8965	.9297	.9629	.9961	1.0293	1.0625
$\frac{3}{8}$	1.0359	1.0758	1.1156	1.1555	1.1953	1.2352	1.2750
$\frac{7}{16}$	1.2086	1.2551	1.3016	1.3480	1.3945	1.4410	1.4875
$\frac{1}{2}$	1.3813	1.4344	1.4875	1.5406	1.5938	1.6469	1.7000
$\frac{9}{16}$	1.5539	1.6137	1.6734	1.7332	1.7930	1.8527	1.9125
$\frac{5}{8}$	1.7266	1.7930	1.8594	1.9258	1.9922	2.0586	2.1250
$\frac{11}{16}$	1.8992	1.9723	2.0453	2.1184	2.1914	2.2645	2.3375
$\frac{3}{4}$	2.0719	2.1516	2.2313	2.3109	2.3906	2.4703	2.5500
$\frac{13}{16}$	2.2445	2.3309	2.4172	2.5035	2.5898	2.6762	2.7625
$\frac{7}{8}$	2.4172	2.5102	2.6031	2.6961	2.7891	2.8820	2.9750
$\frac{15}{16}$	2.5898	2.6895	2.7891	2.8887	2.9883	3.0879	3.1875
0	2.7625	2.8688	2.9750	3.0813	3.1875	3.2938	3.4000
$\frac{1}{8}$	3.1078	3.2273	3.3469	3.4664	3.5859	3.7055	3.8250
$\frac{1}{4}$	3.4531	3.5859	3.7188	3.8516	3.9844	4.1172	4.2500
$\frac{3}{8}$	3.7984	3.9445	4.0906	4.2367	4.3828	4.5289	4.6750
1	4.1438	4.3031	4.4625	4.6219	4.7813	4.9406	5.1000
$\frac{1}{2}$	4.4891	4.6617	4.8344	5.0070	5.1797	5.3523	5.5250
$\frac{5}{8}$	4.8344	5.0203	5.2063	5.3922	5.5781	5.7641	5.9500
$\frac{3}{4}$	5.1797	5.3789	5.5781	5.7773	5.9766	6.1758	6.3750
2	5.5250	5.7375	5.9500	6.1625	6.3750	6.5875	6.8000
$\frac{1}{8}$	5.8703	6.0961	6.3219	6.5477	6.7734	6.9992	7.2250
$\frac{1}{4}$	6.2156	6.4547	6.6938	6.9328	7.1719	7.4109	7.6500

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$1\frac{1}{32}$	$1\frac{1}{16}$	$1\frac{3}{32}$	$1\frac{1}{8}$	$1\frac{5}{32}$	$1\frac{3}{16}$	$1\frac{7}{32}$
$\frac{1}{32}$	.1096	.1129	.1162	.1195	.1229	.1262	.1295
$\frac{1}{16}$	.2191	.2258	.2324	.2391	.2457	.2523	.2590
$\frac{3}{32}$	.3287	.3387	.3486	.3586	.3686	.3785	.3885
$\frac{1}{8}$	.4383	.4516	.4648	.4781	.4914	.5047	.5180
$\frac{5}{32}$	.5479	.5645	.5811	.5977	.6143	.6309	.6475
$\frac{3}{16}$	.6574	.6773	.6973	.7172	.7371	.7570	.7770
$\frac{7}{32}$	.7670	.7902	.8135	.8367	.8600	.8832	.9064
$\frac{1}{4}$	.8766	.9031	.9297	.9563	.9828	1.0094	1.0359
$\frac{5}{16}$	1.0957	1.1289	1.1621	1.1953	1.2285	1.2617	1.2949
$\frac{3}{8}$	1.3148	1.3547	1.3945	1.4344	1.4742	1.5141	1.5539
$\frac{7}{16}$	1.5340	1.5805	1.6270	1.6734	1.7199	1.7664	1.8129
$\frac{1}{2}$	1.7531	1.8063	1.8594	1.9125	1.9656	2.0188	2.0719
$\frac{9}{16}$	2.1973	2.2630	2.3287	2.3944	2.4601	2.5258	2.5915
$\frac{5}{8}$	2.6194	2.6978	2.7762	2.8546	2.9330	3.0114	3.0898
$\frac{11}{16}$	2.4105	2.4836	2.5566	2.6297	2.7027	2.7758	2.8488
$\frac{3}{4}$	2.6297	2.7094	2.7891	2.8688	2.9484	3.0281	3.1078
$\frac{13}{16}$	2.8488	2.9352	3.0215	3.1078	3.1941	3.2805	3.3668
$\frac{7}{8}$	3.0680	3.1609	3.2539	3.3469	3.4398	3.5328	3.6258
$\frac{15}{16}$	3.2871	3.3867	3.4863	3.5859	3.6855	3.7852	3.8848
0	3.5063	3.6125	3.7188	3.8250	3.9313	4.0375	4.1438
$\frac{1}{8}$	3.9445	4.0641	4.1836	4.3031	4.4227	4.5422	4.6617
$\frac{1}{4}$	4.3828	4.5156	4.6484	4.7813	4.9141	5.0469	5.1797
$\frac{3}{8}$	4.8211	4.9672	5.1133	5.2594	5.4055	5.5516	5.6977
$\frac{1}{2}$	5.2594	5.4188	5.5781	5.7375	5.8969	6.0563	6.2156
$\frac{5}{8}$	5.6977	5.8703	6.0430	6.2156	6.3883	6.5609	6.7336
$\frac{3}{4}$	6.1359	6.3219	6.5078	6.6938	6.8797	7.0656	7.2516
$\frac{7}{8}$	6.5742	6.7734	6.9727	7.1719	7.3711	7.5703	7.7695
0	7.0125	7.2250	7.4375	7.6500	7.8625	8.0750	8.2875
$\frac{1}{8}$	7.4508	7.6766	7.9023	8.1281	8.3539	8.5797	8.8055
$\frac{1}{4}$	7.8891	8.1281	8.3672	8.6063	8.8453	9.0844	9.3234

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	1 $\frac{1}{4}$	1 $\frac{9}{32}$	1 $\frac{5}{16}$	1 $\frac{11}{32}$	1 $\frac{3}{8}$	1 $\frac{13}{32}$	1 $\frac{7}{16}$
$\frac{1}{32}$	.1328	.1361	.139	.143	.146	.149	.153
$\frac{1}{16}$	.2656	.2723	.279	.286	.292	.299	.305
$\frac{3}{32}$	.3984	.4084	.418	.428	.438	.448	.458
$\frac{1}{8}$	.5313	.5445	.558	.571	.584	.598	.611
$\frac{5}{32}$	.6641	.6807	.697	.714	.730	.747	.764
$\frac{3}{16}$	.7969	.8168	.837	.857	.877	.896	.916
$\frac{7}{32}$	.9297	.9529	.976	.999	1.023	1.046	1.069
$\frac{1}{4}$	1.0625	1.0891	1.116	1.142	1.169	1.195	1.222
$\frac{5}{16}$	1.3281	1.3613	1.395	1.428	1.461	1.494	1.527
$\frac{3}{8}$	1.5938	1.6336	1.673	1.713	1.753	1.793	1.833
$\frac{7}{16}$	1.8594	1.9059	1.952	1.999	2.045	2.092	2.138
$\frac{1}{2}$	2.1250	2.1781	2.231	2.284	2.338	2.391	2.444
$\frac{9}{16}$	2.3906	2.4504	2.510	2.570	2.630	2.689	2.749
$\frac{5}{8}$	2.6563	2.7227	2.789	2.855	2.922	2.988	3.055
$\frac{11}{16}$	2.9219	2.9949	3.068	3.141	3.214	3.287	3.360
$\frac{3}{4}$	3.1875	3.2672	3.347	3.427	3.506	3.586	3.666
$\frac{13}{16}$	3.4531	3.5395	3.626	3.712	3.798	3.885	3.971
$\frac{7}{8}$	3.7188	3.8117	3.905	3.998	4.091	4.184	4.277
$\frac{15}{16}$	3.9844	4.0840	4.184	4.283	4.383	4.482	4.582
0	4.2500	4.3563	4.463	4.569	4.675	4.781	4.888
$\frac{1}{8}$	4.7813	4.9008	5.020	5.140	5.259	5.379	5.498
$\frac{1}{4}$	5.3125	5.4453	5.578	5.711	5.844	5.977	6.109
$\frac{3}{8}$	5.8438	5.9898	6.136	6.282	6.428	6.574	6.720
$\frac{1}{2}$	6.3750	6.5344	6.694	6.853	7.013	7.172	7.331
$\frac{5}{8}$	6.9063	7.0789	7.252	7.424	7.597	7.770	7.942
$\frac{3}{4}$	7.4375	7.6234	7.809	7.995	8.181	8.367	8.553
$\frac{7}{8}$	7.9688	8.1680	8.367	8.566	8.766	8.965	9.164
0	8.5000	8.7125	8.925	9.138	9.350	9.563	9.775
$\frac{1}{8}$	9.0313	9.2570	9.483	9.709	9.934	10.160	10.386
$\frac{1}{4}$	9.5625	9.8016	10.041	10.280	10.519	10.758	10.997

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$1\frac{15}{32}$	$1\frac{1}{2}$	$1\frac{9}{16}$	$1\frac{5}{8}$	$1\frac{11}{16}$	$1\frac{3}{4}$	$1\frac{13}{16}$
$\frac{1}{32}$	.156	.159	.166	.173	.179	.186	.193
$\frac{1}{16}$	.312	.319	.332	.345	.359	.372	.385
$\frac{3}{32}$	.468	.478	.498	.518	.538	.558	.578
$\frac{1}{8}$	.624	.638	.664	.691	.717	.744	.770
$\frac{5}{32}$	.780	.797	.830	.863	.896	.930	.963
$\frac{3}{16}$	.936	.956	.996	1.036	1.076	1.116	1.155
$\frac{7}{32}$	1.092	1.116	1.162	1.209	1.255	1.302	1.348
$\frac{1}{4}$	1.248	1.275	1.328	1.381	1.434	1.488	1.541
$\frac{5}{16}$	1.561	1.594	1.660	1.727	1.793	1.859	1.926
$\frac{3}{8}$	1.873	1.913	1.992	2.072	2.152	2.231	2.311
$\frac{7}{16}$	2.185	2.231	2.324	2.417	2.510	2.603	2.696
$\frac{1}{2}$	2.497	2.550	2.656	2.763	2.869	2.975	3.081
$\frac{9}{16}$	2.809	2.869	2.938	3.108	3.227	3.347	3.466
$\frac{5}{8}$	3.121	3.188	3.320	3.453	3.586	3.719	3.852
$\frac{11}{16}$	3.433	3.506	3.652	3.798	3.945	4.091	4.237
$\frac{3}{4}$	3.745	3.825	3.984	4.144	4.303	4.463	4.622
$\frac{13}{16}$	4.057	4.144	4.316	4.489	4.662	4.834	5.007
$\frac{7}{8}$	4.370	4.463	4.648	4.834	5.020	5.206	5.392
$\frac{15}{16}$	4.682	4.781	4.980	5.180	5.379	5.578	5.777
0	4.994	5.100	5.313	5.525	5.738	5.950	6.163
$\frac{1}{8}$	5.618	5.738	5.977	6.216	6.455	6.694	6.933
$\frac{1}{4}$	6.242	6.375	6.641	6.906	7.172	7.438	7.703
$\frac{3}{8}$	6.866	7.013	7.305	7.597	7.889	8.181	8.473
$\frac{1}{2}$	7.491	7.650	7.969	8.288	8.606	8.925	9.244
$\frac{5}{8}$	8.115	8.288	8.633	8.978	9.323	9.669	10.014
$\frac{3}{4}$	8.739	8.925	9.297	9.669	10.041	10.413	10.784
$\frac{7}{8}$	9.363	9.563	9.961	10.359	10.758	11.156	11.555
0	9.988	10.200	10.625	11.050	11.475	11.900	12.325
$\frac{1}{8}$	10.612	10.838	11.289	11.741	12.192	12.644	13.095
$\frac{1}{4}$	11.236	11.475	11.953	12.431	12.909	13.388	13.866

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	1 $\frac{7}{8}$	1 $\frac{5}{16}$	2	2 $\frac{1}{16}$	2 $\frac{1}{8}$	2 $\frac{3}{16}$	2 $\frac{1}{4}$
$\frac{1}{32}$	.199	.206	.213	.219	.226	.232	.239
$\frac{1}{16}$	.398	.412	.425	.438	.452	.465	.478
$\frac{3}{32}$	.598	.618	.638	.657	.677	.697	.717
$\frac{1}{8}$	.797	.823	.850	.877	.903	.930	.956
$\frac{5}{32}$	.996	1.029	1.063	1.096	1.129	1.162	1.195
$\frac{3}{16}$	1.195	1.235	1.275	1.315	1.355	1.395	1.434
$\frac{7}{32}$	1.395	1.441	1.488	1.534	1.580	1.627	1.673
$\frac{1}{4}$	1.594	1.647	1.700	1.753	1.806	1.859	1.913
$\frac{5}{16}$	1.992	2.059	2.125	2.191	2.258	2.324	2.391
$\frac{3}{8}$	2.391	2.470	2.550	2.630	2.709	2.789	2.869
$\frac{7}{16}$	2.789	2.882	2.975	3.068	3.161	3.254	3.347
$\frac{1}{2}$	3.188	3.294	3.400	3.506	3.613	3.719	3.825
$\frac{9}{16}$	3.586	3.705	3.825	3.945	4.064	4.184	4.303
$\frac{5}{8}$	3.984	4.117	4.250	4.383	4.516	4.648	4.781
$\frac{11}{16}$	4.383	4.529	4.675	4.821	4.967	5.113	5.259
$\frac{3}{4}$	4.781	4.941	5.100	5.259	5.419	5.578	5.738
$\frac{13}{16}$	5.180	5.352	5.525	5.698	5.870	6.043	6.216
$\frac{7}{8}$	5.578	5.764	5.950	6.136	6.322	6.508	6.694
$\frac{15}{16}$	5.977	6.176	6.375	6.574	6.773	6.973	7.172
0	6.375	6.588	6.800	7.013	7.225	7.438	7.650
$\frac{1}{8}$	7.172	7.411	7.650	7.889	8.128	8.367	8.606
$\frac{1}{4}$	7.969	8.234	8.500	8.766	9.031	9.297	9.563
$\frac{3}{8}$	8.766	9.058	9.350	9.642	9.934	10.227	10.519
$\frac{1}{2}$	9.563	9.881	10.200	10.519	10.838	11.156	11.475
$\frac{5}{8}$	10.359	10.705	11.050	11.395	11.741	12.086	12.431
$\frac{3}{4}$	11.156	11.528	11.900	12.272	12.644	13.016	13.388
$\frac{7}{8}$	11.953	12.352	12.750	13.148	13.547	13.945	14.344
0	12.750	13.175	13.600	14.025	14.450	14.875	15.300
$\frac{1}{8}$	13.547	13.998	14.450	14.902	15.353	15.805	16.256
$\frac{1}{4}$	14.344	14.822	15.300	15.778	16.256	16.734	17.213

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL **WEIGHT PER LINEAR FOOT, POUNDS**

Thick- ness, Inches	WIDTH, INCHES						
	$2\frac{5}{16}$	$2\frac{3}{8}$	$2\frac{7}{16}$	$2\frac{1}{2}$	$2\frac{9}{16}$	$2\frac{5}{8}$	$2\frac{11}{16}$
$\frac{1}{32}$	.246	.252	.259	.266	.272	.279	.286
$\frac{1}{16}$	.491	.505	.518	.531	.545	.558	.571
$\frac{3}{32}$	.737	.757	.777	.797	.817	.837	.857
$\frac{1}{8}$	.983	1.009	1.036	1.063	1.089	1.116	1.142
$\frac{5}{32}$	1.229	1.262	1.295	1.328	1.361	1.395	1.428
$\frac{3}{16}$	1.474	1.514	1.554	1.594	1.634	1.673	1.713
$\frac{7}{32}$	1.720	1.766	1.813	1.859	1.906	1.952	1.999
$\frac{1}{4}$	1.966	2.019	2.072	2.125	2.178	2.231	2.284
$\frac{5}{16}$	2.457	2.523	2.590	2.656	2.723	2.789	2.855
$\frac{3}{8}$	2.948	3.028	3.108	3.188	3.267	3.347	3.427
$\frac{7}{16}$	3.440	3.533	3.626	3.719	3.812	3.905	3.998
$\frac{1}{2}$	3.931	4.038	4.144	4.250	4.356	4.463	4.569
$\frac{9}{16}$	4.423	4.542	4.662	4.781	4.901	5.020	5.140
$\frac{5}{8}$	4.914	5.047	5.180	5.313	5.445	5.578	5.711
$\frac{11}{16}$	5.405	5.552	5.698	5.844	5.990	6.136	6.282
$\frac{3}{4}$	5.897	6.056	6.216	6.375	6.534	6.694	6.853
$\frac{13}{16}$	6.388	6.561	6.734	6.906	7.079	7.252	7.424
$\frac{7}{8}$	6.880	7.066	7.252	7.438	7.623	7.809	7.995
$\frac{15}{16}$	7.371	7.570	7.770	7.969	8.168	8.367	8.566
0	7.863	8.075	8.288	8.500	8.713	8.925	9.138
$\frac{1}{8}$	8.845	9.084	9.323	9.563	9.802	10.041	10.280
$\frac{1}{4}$	9.828	10.094	10.359	10.625	10.891	11.156	11.422
$\frac{3}{8}$	10.811	11.103	11.395	11.688	11.980	12.272	12.564
$\frac{1}{2}$	11.794	12.113	12.431	12.750	13.069	13.388	13.706
$\frac{5}{8}$	12.777	13.122	13.467	13.813	14.158	14.503	14.848
$\frac{3}{4}$	13.759	14.131	14.503	14.875	15.247	15.619	15.991
$\frac{7}{8}$	14.742	15.141	15.539	15.938	16.336	16.734	17.133
0	15.725	16.150	16.575	17.000	17.425	17.850	18.275
$\frac{1}{8}$	.708	17.159	17.611	18.063	18.514	18.966	19.417
$\frac{1}{4}$	.691	18.169	18.647	19.125	19.603	20.081	20.559

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL **WEIGHT PER LINEAR FOOT, POUNDS**

Thick- ness, Inches	WIDTH, INCHES						
	$2\frac{3}{4}$	$2\frac{13}{16}$	$2\frac{7}{8}$	$2\frac{15}{16}$	3	$3\frac{1}{16}$	$3\frac{1}{8}$
$\frac{1}{32}$	.292	.299	.305	.312	.319	.325	.332
$\frac{1}{16}$	.584	.598	.611	.624	.638	.651	.664
$\frac{3}{32}$	.877	.896	.916	.936	.956	.976	.996
$\frac{1}{8}$	1.169	1.195	1.222	1.248	1.275	1.302	1.328
$\frac{5}{32}$	1.461	1.494	1.527	1.561	1.594	1.627	1.660
$\frac{3}{16}$	1.753	1.793	1.833	1.873	1.913	1.952	1.992
$\frac{7}{32}$	2.045	2.092	2.138	2.185	2.231	2.278	2.324
$\frac{1}{4}$	2.338	2.391	2.444	2.497	2.550	2.603	2.656
$\frac{5}{16}$	2.922	2.988	3.055	3.121	3.188	3.254	3.320
$\frac{3}{8}$	3.506	3.586	3.666	3.745	3.825	3.905	3.984
$\frac{7}{16}$	4.091	4.184	4.277	4.370	4.463	4.555	4.648
$\frac{1}{2}$	4.675	4.781	4.888	4.994	5.100	5.206	5.313
$\frac{9}{16}$	5.259	5.379	5.498	5.618	5.738	5.857	5.977
$\frac{5}{8}$	5.844	5.977	6.109	6.242	6.375	6.508	6.641
$\frac{11}{16}$	6.428	6.574	6.720	6.866	7.013	7.159	7.305
$\frac{3}{4}$	7.013	7.172	7.331	7.491	7.650	7.809	7.969
$\frac{13}{16}$	7.597	7.770	7.942	8.115	8.288	8.460	8.633
$\frac{7}{8}$	8.181	8.367	8.553	8.739	8.925	9.111	9.297
$\frac{15}{16}$	8.766	8.965	9.164	9.363	9.563	9.762	9.961
0	9.350	9.563	9.775	9.988	10.200	10.413	10.625
$\frac{1}{8}$	10.519	10.758	10.997	11.236	11.475	11.714	11.953
$\frac{1}{4}$	11.688	11.953	12.219	12.484	12.750	13.016	13.281
$\frac{3}{8}$	12.856	13.148	13.441	13.733	14.025	14.317	14.609
$\frac{1}{2}$	14.025	14.344	14.663	14.981	15.300	15.619	15.938
$\frac{5}{8}$	15.194	15.539	15.884	16.230	16.575	16.920	17.266
$\frac{3}{4}$	16.363	16.734	17.106	17.478	17.850	18.222	18.594
$\frac{7}{8}$	17.531	17.930	18.328	18.727	19.125	19.523	19.922
0	18.700	19.125	19.550	19.975	20.400	20.825	21.250
$\frac{1}{8}$	19.869	20.320	20.772	21.223	21.675	22.127	22.578
$\frac{1}{4}$	21.038	21.516	21.994	22.472	22.950	23.428	23.906

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$3\frac{3}{16}$	$3\frac{1}{4}$	$3\frac{5}{16}$	$3\frac{3}{8}$	$3\frac{7}{16}$	$3\frac{1}{2}$	$3\frac{9}{16}$
$\frac{1}{32}$	.339	.345	.352	.359	.365	.372	.379
$\frac{1}{16}$	.677	.691	.704	.717	.730	.744	.757
$\frac{3}{32}$	1.016	1.036	1.056	1.076	1.096	1.116	1.136
$\frac{1}{8}$	1.355	1.381	1.408	1.434	1.461	1.488	1.514
$\frac{5}{32}$	1.693	1.727	1.760	1.793	1.826	1.859	1.893
$\frac{3}{16}$	2.032	2.072	2.112	2.152	2.191	2.231	2.271
$\frac{7}{32}$	2.371	2.417	2.464	2.510	2.557	2.603	2.650
$\frac{1}{4}$	2.709	2.763	2.816	2.869	2.922	2.975	3.028
$\frac{5}{16}$	3.387	3.453	3.520	3.586	3.652	3.719	3.785
$\frac{3}{8}$	4.064	4.144	4.223	4.303	4.383	4.463	4.542
$\frac{7}{16}$	4.741	4.834	4.927	5.020	5.113	5.206	5.299
$\frac{1}{2}$	5.419	5.525	5.631	5.738	5.844	5.950	6.056
$\frac{9}{16}$	6.096	6.216	6.335	6.455	6.574	6.694	6.813
$\frac{5}{8}$	6.773	6.906	7.039	7.172	7.305	7.438	7.570
$\frac{11}{16}$	7.451	7.597	7.743	7.889	8.035	8.181	8.327
$\frac{3}{4}$	8.128	8.288	8.447	8.606	8.766	8.925	9.084
$\frac{13}{16}$	8.805	8.978	9.151	9.323	9.496	9.669	9.841
$\frac{7}{8}$	9.483	9.669	9.855	10.041	10.227	10.413	10.598
$\frac{15}{16}$	10.160	10.359	10.559	10.758	10.957	11.156	11.355
0	10.838	11.050	11.263	11.475	11.688	11.900	12.113
$\frac{1}{8}$	12.192	12.431	12.670	12.909	13.148	13.388	13.627
$\frac{1}{4}$	13.547	13.813	14.078	14.344	14.609	14.875	15.141
$\frac{3}{8}$	14.902	15.194	15.486	15.778	16.070	16.363	16.655
$\frac{1}{2}$	16.256	16.575	16.894	17.213	17.531	17.850	18.169
$\frac{5}{8}$	17.611	17.956	18.302	18.647	18.992	19.338	19.683
$\frac{3}{4}$	18.966	19.338	19.709	20.081	20.453	20.825	21.197
$\frac{7}{8}$	20.320	20.719	21.117	21.516	21.914	22.313	22.711
0	21.675	22.100	22.525	22.950	23.375	23.800	24.225
$\frac{1}{8}$	23.030	23.481	23.933	24.384	24.836	25.288	25.739
$\frac{1}{4}$	24.384	24.863	25.341	25.819	26.297	26.775	27.253

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$3\frac{5}{8}$	$3\frac{11}{16}$	$3\frac{3}{4}$	$3\frac{13}{16}$	$3\frac{7}{8}$	$3\frac{15}{16}$	4
$\frac{1}{32}$	.385	.392	.398	.405	.412	.418	.425
$\frac{1}{16}$	.770	.784	.797	.810	.823	.837	.850
$\frac{3}{32}$	1.155	1.175	1.195	1.215	1.235	1.255	1.275
$\frac{1}{8}$	1.541	1.567	1.594	1.620	1.647	1.673	1.700
$\frac{5}{32}$	1.926	1.959	1.992	2.025	2.059	2.092	2.125
$\frac{3}{16}$	2.311	2.351	2.391	2.430	2.470	2.510	2.550
$\frac{7}{32}$	2.696	2.743	2.789	2.836	2.882	2.929	2.975
$\frac{1}{4}$	3.081	3.134	3.188	3.241	3.294	3.347	3.400
$\frac{5}{16}$	3.852	3.918	3.984	4.051	4.117	4.184	4.250
$\frac{3}{8}$	4.622	4.702	4.781	4.861	4.941	5.020	5.100
$\frac{7}{16}$	5.392	5.485	5.578	5.671	5.764	5.857	5.950
$\frac{1}{2}$	6.163	6.269	6.375	6.481	6.588	6.694	6.800
$\frac{9}{16}$	6.933	7.052	7.172	7.291	7.411	7.531	7.650
$\frac{5}{8}$	7.703	7.836	7.969	8.102	8.234	8.367	8.500
$\frac{11}{16}$	8.473	8.620	8.766	8.912	9.058	9.204	9.350
$\frac{3}{4}$	9.244	9.403	9.563	9.722	9.881	10.041	10.200
$\frac{13}{16}$	10.014	10.187	10.359	10.532	10.705	10.877	11.050
$\frac{7}{8}$	10.784	10.970	11.156	11.342	11.528	11.714	11.900
$\frac{15}{16}$	11.555	11.754	11.953	12.152	12.352	12.551	12.750
0	12.325	12.538	12.750	12.963	13.175	13.388	13.600
$\frac{1}{8}$	13.866	14.105	14.344	14.583	14.822	15.061	15.300
$\frac{1}{4}$	15.406	15.672	15.938	16.203	16.469	16.734	17.000
$\frac{3}{8}$	16.947	17.239	17.531	17.823	18.116	18.408	18.700
$\frac{1}{2}$	18.488	18.806	19.125	19.444	19.763	20.081	20.400
$\frac{5}{8}$	20.028	20.373	20.719	21.064	21.409	21.755	22.100
$\frac{3}{4}$	21.569	21.941	22.313	22.684	23.056	23.428	23.800
$\frac{7}{8}$	23.109	23.508	23.906	24.305	24.703	25.102	25.500
0	24.650	25.075	25.500	25.925	26.350	26.775	27.200
$\frac{1}{8}$	26.191	26.642	27.094	27.545	27.997	28.448	28.900
$\frac{1}{4}$	27.731	28.209	28.688	29.166	29.644	30.122	30.600

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$4\frac{1}{16}$	$4\frac{1}{8}$	$4\frac{3}{16}$	$4\frac{1}{4}$	$4\frac{5}{16}$	$4\frac{3}{8}$	$4\frac{7}{16}$
$\frac{1}{32}$	.432	.438	.445	.452	.458	.465	.471
$\frac{1}{16}$	.863	.877	.890	.903	.916	.930	.943
$\frac{3}{32}$	1.295	1.315	1.335	1.355	1.375	1.395	1.414
$\frac{1}{8}$	1.727	1.753	1.780	1.806	1.833	1.859	1.886
$\frac{5}{32}$	2.158	2.191	2.225	2.258	2.291	2.324	2.357
$\frac{3}{16}$	2.590	2.630	2.670	2.709	2.749	2.789	2.829
$\frac{7}{32}$	3.021	3.068	3.114	3.161	3.207	3.254	3.300
$\frac{1}{4}$	3.453	3.506	3.559	3.613	3.666	3.719	3.772
$\frac{5}{16}$	4.316	4.383	4.449	4.516	4.582	4.648	4.715
$\frac{3}{8}$	5.180	5.259	5.339	5.419	5.498	5.578	5.658
$\frac{7}{16}$	6.043	6.136	6.229	6.322	6.415	6.508	6.601
$\frac{1}{2}$	6.906	7.013	7.119	7.225	7.331	7.438	7.544
$\frac{9}{16}$	7.770	7.889	8.009	8.128	8.248	8.367	8.487
$\frac{5}{8}$	8.633	8.766	8.898	9.031	9.164	9.297	9.430
$\frac{11}{16}$	9.496	9.642	9.788	9.934	10.080	10.227	10.373
$\frac{3}{4}$	10.359	10.519	10.678	10.838	10.997	11.156	11.316
$\frac{13}{16}$	11.223	11.395	11.568	11.741	11.913	12.086	12.259
$\frac{7}{8}$	12.086	12.272	12.458	12.644	12.830	13.016	13.202
$\frac{15}{16}$	12.949	13.148	13.348	13.547	13.746	13.945	14.145
0	13.813	14.025	14.238	14.450	14.663	14.875	15.088
$\frac{1}{8}$	15.539	15.778	16.017	16.256	16.495	16.734	16.973
$\frac{1}{4}$	17.266	17.531	17.797	18.063	18.328	18.594	18.859
$\frac{3}{8}$	18.992	19.284	19.577	19.869	20.161	20.453	20.745
$\frac{1}{2}$	20.719	21.038	21.356	21.675	21.994	22.313	22.631
$\frac{5}{8}$	22.445	22.791	23.136	23.481	23.827	24.172	24.517
$\frac{3}{4}$	24.172	24.544	24.916	25.288	25.659	26.031	26.403
$\frac{7}{8}$	25.898	26.297	26.695	27.094	27.492	27.891	28.289
0	28.015	28.425	28.835	29.245	29.655	30.065	30.475
$\frac{1}{8}$	30.182	30.613	31.044	31.475	31.906	32.337	32.768
$\frac{1}{4}$	32.349	32.801	33.253	33.705	34.157	34.609	35.061

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	$4\frac{1}{2}$	$4\frac{9}{16}$	$4\frac{5}{8}$	$4\frac{11}{16}$	$4\frac{3}{4}$	$4\frac{7}{8}$	5
$\frac{1}{32}$	.478	.485	.491	.498	.505	.518	.531
$\frac{1}{16}$	.956	.970	.983	.996	1.009	1.036	1.063
$\frac{3}{32}$	1.434	1.454	1.474	1.494	1.514	1.554	1.594
$\frac{1}{8}$	1.913	1.939	1.966	1.992	2.019	2.072	2.125
$\frac{5}{32}$	2.391	2.424	2.457	2.490	2.523	2.590	2.656
$\frac{3}{16}$	2.869	2.909	2.948	2.988	3.028	3.108	3.188
$\frac{7}{32}$	3.347	3.393	3.440	3.486	3.533	3.626	3.719
$\frac{1}{4}$	3.825	3.878	3.931	3.984	4.038	4.144	4.250
$\frac{5}{16}$	4.781	4.848	4.914	4.980	5.047	5.180	5.313
$\frac{3}{8}$	5.738	5.817	5.897	5.977	6.056	6.216	6.375
$\frac{7}{16}$	6.694	6.787	6.880	6.973	7.066	7.252	7.438
$\frac{1}{2}$	7.650	7.756	7.863	7.969	8.075	8.288	8.500
$\frac{9}{16}$	8.606	8.726	8.845	8.965	9.084	9.323	9.563
$\frac{5}{8}$	9.563	9.695	9.828	9.961	10.094	10.359	10.625
$\frac{11}{16}$	10.519	10.665	10.811	10.957	11.103	11.395	11.688
$\frac{3}{4}$	11.475	11.634	11.794	11.953	12.113	12.431	12.750
$\frac{13}{16}$	12.431	12.604	12.777	12.949	13.122	13.467	13.813
$\frac{7}{8}$	13.388	13.573	13.759	13.945	14.131	14.503	14.875
$\frac{15}{16}$	14.344	14.543	14.742	14.941	15.141	15.539	15.938
0	15.300	15.513	15.725	15.938	16.150	16.575	17.000
$\frac{1}{8}$	17.213	17.452	17.691	17.930	18.169	18.647	19.125
$\frac{1}{4}$	19.125	19.391	19.656	19.922	20.188	20.719	21.250
$\frac{3}{8}$	21.038	21.330	21.622	21.914	22.206	22.791	23.375
$\frac{1}{2}$	22.950	23.269	23.588	23.906	24.225	24.863	25.500
$\frac{5}{8}$	24.863	25.208	25.553	25.898	26.244	26.934	27.625
$\frac{3}{4}$	26.775	27.147	27.519	27.891	28.263	29.006	29.750
$\frac{7}{8}$	28.688	29.086	29.484	29.883	30.281	31.078	31.875
0	30.600	31.025	31.450	31.875	32.30		34.000
$\frac{1}{8}$	32.513	32.964	33.416	33.867	34.31		36.125
$\frac{1}{4}$	34.425	34.903	35.381	35.859	36.338		38.250

For HIGH SPEED STEEL add 10 per cen

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	5 $\frac{1}{8}$	5 $\frac{1}{4}$	5 $\frac{3}{8}$	5 $\frac{1}{2}$	5 $\frac{5}{8}$	5 $\frac{3}{4}$	5 $\frac{7}{8}$
$\frac{1}{32}$	.545	.558	.571	.584	.598	.611	.624
$\frac{1}{16}$	1.089	1.116	1.142	1.169	1.195	1.222	1.248
$\frac{3}{32}$	1.634	1.673	1.713	1.753	1.793	1.833	1.873
$\frac{1}{8}$	2.178	2.231	2.284	2.338	2.391	2.444	2.497
$\frac{5}{32}$	2.723	2.789	2.855	2.922	2.988	3.055	3.121
$\frac{3}{16}$	3.267	3.347	3.427	3.506	3.586	3.666	3.745
$\frac{7}{32}$	3.812	3.905	3.998	4.091	4.184	4.277	4.370
$\frac{1}{4}$	4.356	4.463	4.569	4.675	4.781	4.888	4.994
$\frac{5}{16}$	5.445	5.578	5.711	5.844	5.977	6.109	6.242
$\frac{3}{8}$	6.534	6.694	6.853	7.013	7.172	7.331	7.491
$\frac{7}{16}$	7.623	7.809	7.995	8.181	8.367	8.553	8.739
$\frac{1}{2}$	8.713	8.925	9.138	9.350	9.563	9.775	9.988
$\frac{9}{16}$	9.802	10.041	10.280	10.519	10.758	10.997	11.236
$\frac{5}{8}$	10.891	11.156	11.422	11.688	11.953	12.219	12.484
$\frac{11}{16}$	11.980	12.272	12.564	12.856	13.148	13.441	13.733
$\frac{3}{4}$	13.069	13.388	13.706	14.025	14.344	14.663	14.981
$\frac{13}{16}$	14.158	14.503	14.848	15.194	15.539	15.884	16.230
$\frac{7}{8}$	15.247	15.619	15.991	16.363	16.734	17.106	17.478
$\frac{15}{16}$	16.336	16.734	17.133	17.531	17.930	18.328	18.727
0	17.425	17.850	18.275	18.700	19.125	19.550	19.975
$\frac{1}{8}$	19.603	20.081	20.559	21.038	21.516	21.994	22.472
$\frac{1}{4}$	21.781	22.313	22.844	23.375	23.906	24.438	24.969
$\frac{3}{8}$	23.959	24.544	25.128	25.713	26.297	26.881	27.466
1	26.138	26.775	27.413	28.050	28.688	29.325	29.963
$\frac{5}{8}$	28.316	29.006	29.697	30.388	31.078	31.769	32.459
$\frac{3}{4}$	30.494	31.238	31.981	32.725	33.469	34.213	34.956
$\frac{7}{8}$	32.672	33.469	34.266	35.063	35.859	36.656	37.453
0	34.850	35.700	36.550	37.400	38.250	39.100	39.950
$\frac{1}{8}$	37.028	37.931	38.834	39.738	40.641	41.544	42.447
$\frac{1}{4}$	39.206	40.163	41.119	42.075	43.031	43.988	44.944

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	6	6 $\frac{1}{8}$	6 $\frac{1}{4}$	6 $\frac{3}{8}$	6 $\frac{1}{2}$	6 $\frac{5}{8}$	6 $\frac{3}{4}$
$\frac{1}{32}$	.638	.651	.664	.677	.691	.704	.717
$\frac{1}{16}$	1.275	1.302	1.328	1.355	1.381	1.408	1.434
$\frac{3}{32}$	1.913	1.952	1.992	2.032	2.072	2.112	2.152
$\frac{1}{8}$	2.550	2.603	2.656	2.709	2.763	2.816	2.869
$\frac{5}{32}$	3.188	3.254	3.320	3.387	3.453	3.520	3.586
$\frac{3}{16}$	3.825	3.905	3.984	4.064	4.144	4.223	4.303
$\frac{7}{32}$	4.463	4.555	4.648	4.741	4.834	4.927	5.020
$\frac{1}{4}$	5.100	5.206	5.313	5.419	5.525	5.631	5.738
$\frac{5}{16}$	6.375	6.508	6.641	6.773	6.906	7.039	7.172
$\frac{3}{8}$	7.650	7.809	7.969	8.128	8.288	8.447	8.606
$\frac{7}{16}$	8.925	9.111	9.297	9.483	9.669	9.855	10.041
$\frac{1}{2}$	10.200	10.413	10.625	10.838	11.050	11.263	11.475
$\frac{9}{16}$	11.475	11.714	11.953	12.192	12.431	12.670	12.909
$\frac{5}{8}$	12.750	13.016	13.281	13.547	13.813	14.078	14.344
$\frac{11}{16}$	14.025	14.317	14.609	14.902	15.194	15.486	15.778
$\frac{3}{4}$	15.300	15.619	15.938	16.256	16.575	16.894	17.213
$\frac{13}{16}$	16.575	16.920	17.266	17.611	17.956	18.302	18.647
$\frac{7}{8}$	17.850	18.222	18.594	18.966	19.338	19.709	20.081
$\frac{15}{16}$	19.125	19.523	19.922	20.320	20.719	21.117	21.516
0	20.400	20.825	21.250	21.675	22.100	22.525	22.950
$\frac{1}{8}$	22.950	23.428	23.906	24.384	24.863	25.341	25.819
$\frac{1}{4}$	25.500	26.031	26.563	27.094	27.625	28.156	28.688
$\frac{3}{8}$	28.050	28.634	29.219	29.803	30.388	30.972	31.556
$\frac{1}{2}$	30.600	31.238	31.875	32.513	33.150	33.788	34.425
$\frac{5}{8}$	33.150	33.841	34.531	35.222	35.913	36.603	37.294
$\frac{3}{4}$	35.700	36.444	37.188	37.931	38.675	39.419	40.163
$\frac{7}{8}$	38.250	39.047	39.844	40.641	41.438	42.234	43.031
0	40.800	41.650	42.500	43.350	44.200	45.050	45.900
$\frac{1}{8}$	43.350	44.253	45.156	46.059	46.963	47.866	48.769
$\frac{1}{4}$	45.900	46.856	47.813	48.769	49.725	50.681	51.638

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	6 $\frac{7}{8}$	7	7 $\frac{1}{8}$	7 $\frac{1}{4}$	7 $\frac{3}{8}$	7 $\frac{1}{2}$	7 $\frac{5}{8}$
$\frac{1}{32}$	.730	.744	.757	.770	.784	.797	.810
$\frac{1}{16}$	1.461	1.488	1.514	1.541	1.567	1.594	1.620
$\frac{3}{32}$	2.191	2.231	2.271	2.311	2.351	2.391	2.430
$\frac{1}{8}$	2.922	2.975	3.028	3.081	3.134	3.188	3.241
$\frac{5}{32}$	3.652	3.719	3.785	3.852	3.918	3.984	4.051
$\frac{3}{16}$	4.383	4.463	4.542	4.622	4.702	4.781	4.861
$\frac{7}{32}$	5.113	5.206	5.299	5.392	5.485	5.578	5.671
$\frac{1}{4}$	5.844	5.950	6.056	6.163	6.269	6.375	6.481
$\frac{5}{16}$	7.305	7.438	7.570	7.703	7.836	7.969	8.102
$\frac{3}{8}$	8.766	8.925	9.084	9.244	9.403	9.563	9.722
$\frac{7}{16}$	10.227	10.413	10.598	10.784	10.970	11.156	11.342
$\frac{1}{2}$	11.688	11.900	12.113	12.325	12.538	12.750	12.963
$\frac{9}{16}$	13.148	13.388	13.627	13.866	14.105	14.344	14.583
$\frac{5}{8}$	14.609	14.875	15.141	15.406	15.672	15.938	16.203
$\frac{11}{16}$	16.070	16.363	16.655	16.947	17.239	17.531	17.823
$\frac{3}{4}$	17.531	17.850	18.169	18.488	18.806	19.125	19.444
$\frac{13}{16}$	18.992	19.338	19.683	20.028	20.373	20.719	21.064
$\frac{7}{8}$	20.453	20.825	21.197	21.569	21.941	22.313	22.684
$\frac{15}{16}$	21.914	22.313	22.711	23.109	23.508	23.906	24.305
0	23.375	23.800	24.225	24.650	25.075	25.500	25.925
$\frac{1}{8}$	26.297	26.775	27.253	27.731	28.209	28.688	29.166
$\frac{1}{4}$	29.219	29.750	30.281	30.813	31.344	31.875	32.406
$\frac{3}{8}$	32.141	32.725	33.309	33.894	34.478	35.063	35.647
$\frac{1}{2}$	35.063	35.700	36.338	36.975	37.613	38.250	38.888
$\frac{5}{8}$	37.984	38.675	39.366	40.056	40.747	41.438	42.128
$\frac{3}{4}$	40.906	41.650	42.394	43.138	43.881	44.625	45.369
$\frac{7}{8}$	43.828	44.625	45.422	46.219	47.016	47.813	48.609
0	46.750	47.600	48.450	49.300	50.150	51.000	51.850
$\frac{1}{8}$	49.672	50.575	51.478	52.381	53.284	54.188	55.091
$\frac{1}{4}$	52.594	53.550	54.506	55.463	56.419	57.375	58.331

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	7¾	7⅞	8	8⅛	8¼	8⅜	8½
$\frac{1}{32}$	.823	.837	.850	.863	.877	.890	.903
$\frac{1}{16}$	1.647	1.673	1.700	1.727	1.753	1.780	1.806
$\frac{3}{32}$	2.470	2.510	2.550	2.590	2.630	2.670	2.709
$\frac{1}{8}$	3.294	3.347	3.400	3.453	3.506	3.559	3.613
$\frac{5}{32}$	4.117	4.184	4.250	4.316	4.383	4.449	4.516
$\frac{3}{16}$	4.941	5.020	5.100	5.180	5.259	5.339	5.419
$\frac{7}{32}$	5.764	5.857	5.950	6.043	6.136	6.229	6.322
$\frac{1}{4}$	6.588	6.694	6.800	6.906	7.013	7.119	7.225
$\frac{5}{16}$	8.234	8.367	8.500	8.633	8.766	8.898	9.031
$\frac{3}{8}$	9.881	10.041	10.200	10.359	10.519	10.678	10.838
$\frac{7}{16}$	11.528	11.714	11.900	12.086	12.272	12.458	12.644
$\frac{1}{2}$	13.175	13.388	13.600	13.813	14.025	14.238	14.450
$\frac{9}{16}$	14.822	15.061	15.300	15.539	15.778	16.017	16.256
$\frac{5}{8}$	16.469	16.734	17.000	17.266	17.531	17.797	18.063
$\frac{11}{16}$	18.116	18.408	18.700	18.992	19.284	19.577	19.869
$\frac{3}{4}$	19.763	20.081	20.400	20.719	21.038	21.356	21.675
$\frac{13}{16}$	21.409	21.755	22.100	22.445	22.791	23.136	23.481
$\frac{7}{8}$	23.056	23.428	23.800	24.172	24.544	24.916	25.288
$\frac{15}{16}$	24.703	25.102	25.500	25.898	26.297	26.695	27.094
0	26.350	26.775	27.200	27.625	28.050	28.475	28.900
$\frac{1}{8}$	29.644	30.122	30.600	31.078	31.556	32.034	32.513
$\frac{1}{4}$	32.938	33.469	34.000	34.531	35.063	35.594	36.125
$\frac{3}{8}$	36.231	36.816	37.400	37.984	38.569	39.153	39.738
1	39.525	40.163	40.800	41.438	42.075	42.713	43.350
$\frac{1}{2}$	42.819	43.509	44.200	44.891	45.581	46.272	46.963
$\frac{5}{8}$	46.113	46.856	47.600	48.344	49.088	49.831	50.575
$\frac{3}{4}$	49.406	50.203	51.000	51.797	52.594	53.391	54.188
0	52.700	53.550	54.400	55.250	56.100	56.950	57.800
$\frac{1}{8}$	55.994	56.897	57.800	58.703	59.606	60.509	61.413
$\frac{1}{4}$	59.288	60.244	61.200	62.156	63.113	64.069	65.025

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL WEIGHT PER LINEAR FOOT, POUNDS

Thick- ness, Inches	WIDTH, INCHES						
	8 $\frac{5}{8}$	8 $\frac{3}{4}$	8 $\frac{7}{8}$	9	9 $\frac{1}{8}$	9 $\frac{1}{4}$	9 $\frac{3}{8}$
$\frac{1}{32}$	.916	.930	.943	.956	.970	.983	.996
$\frac{1}{16}$	1.833	1.859	1.883	1.913	1.939	1.966	1.992
$\frac{3}{32}$	2.749	2.789	2.829	2.869	2.909	2.948	2.988
$\frac{1}{8}$	3.666	3.719	3.772	3.825	3.878	3.931	3.984
$\frac{5}{32}$	4.582	4.648	4.715	4.781	4.848	4.914	4.980
$\frac{3}{16}$	5.498	5.578	5.658	5.738	5.817	5.897	5.977
$\frac{7}{32}$	6.415	6.508	6.601	6.694	6.787	6.880	6.973
$\frac{1}{4}$	7.331	7.438	7.544	7.650	7.756	7.863	7.969
$\frac{5}{16}$	9.164	9.297	9.430	9.563	9.695	9.828	9.961
$\frac{3}{8}$	10.997	11.156	11.316	11.475	11.634	11.794	11.953
$\frac{7}{16}$	12.830	13.016	13.202	13.388	13.573	13.759	13.945
$\frac{1}{2}$	14.663	14.875	15.088	15.300	15.513	15.725	15.938
$\frac{9}{16}$	16.495	16.734	16.973	17.213	17.452	17.691	17.930
$\frac{5}{8}$	18.328	18.594	18.859	19.125	19.391	19.656	19.922
$\frac{11}{16}$	20.161	20.453	20.745	21.038	21.330	21.622	21.914
$\frac{3}{4}$	21.994	22.313	22.631	22.950	23.269	23.588	23.906
$\frac{13}{16}$	23.827	24.172	24.517	24.863	25.208	25.553	25.898
$\frac{7}{8}$	25.659	26.031	26.403	26.775	27.147	27.519	27.891
$\frac{15}{16}$	27.492	27.891	28.289	28.688	29.086	29.484	29.883
0	29.325	29.750	30.175	30.600	31.025	31.450	31.875
$\frac{1}{8}$	32.991	33.469	33.947	34.425	34.903	35.381	35.859
$\frac{1}{4}$	36.656	37.188	37.719	38.250	38.781	39.313	39.844
$\frac{3}{8}$	40.322	40.906	41.491	42.075	42.659	43.244	43.828
$\frac{1}{2}$	43.988	44.625	45.263	45.900	46.538	47.175	47.813
$\frac{5}{8}$	47.653	48.344	49.034	49.725	50.416	51.106	51.797
$\frac{3}{4}$	51.319	52.063	52.806	53.550	54.294	55.038	55.781
$\frac{7}{8}$	54.984	55.781	56.578	57.375	58.172	58.969	59.766
0	58.650	59.500	60.350	61.200	62.050	62.900	63.750
$\frac{1}{8}$	62.316	63.219	64.122	65.025	65.928	66.831	67.734
$\frac{1}{4}$	65.981	66.938	67.894	68.850	69.806	70.763	71.719

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL **WEIGHT PER LINEAR FOOT, POUNDS**

Thick- ness, Inches	WIDTH, INCHES						
	9 $\frac{1}{2}$	9 $\frac{5}{8}$	9 $\frac{3}{4}$	10	10 $\frac{1}{4}$	10 $\frac{1}{2}$	10 $\frac{3}{4}$
$\frac{1}{32}$	1.009	1.023	1.036	1.063	1.089	1.116	1.142
$\frac{1}{16}$	2.019	2.045	2.072	2.125	2.178	2.231	2.284
$\frac{3}{32}$	3.028	3.068	3.108	3.188	3.267	3.347	3.427
$\frac{1}{8}$	4.038	4.091	4.144	4.250	4.356	4.463	4.569
$\frac{5}{32}$	5.047	5.113	5.180	5.313	5.445	5.578	5.711
$\frac{3}{16}$	6.056	6.136	6.216	6.375	6.534	6.694	6.853
$\frac{7}{32}$	7.066	7.159	7.252	7.437	7.623	7.809	7.995
$\frac{1}{4}$	8.075	8.181	8.288	8.500	8.713	8.925	9.138
$\frac{5}{16}$	10.094	10.227	10.359	10.625	10.891	11.156	11.422
$\frac{3}{8}$	12.113	12.272	12.431	12.750	13.069	13.388	13.706
$\frac{7}{16}$	14.131	14.317	14.503	14.875	15.247	15.619	15.991
$\frac{1}{2}$	16.150	16.363	16.575	17.000	17.425	17.850	18.275
$\frac{9}{16}$	18.169	18.408	18.647	19.125	19.603	20.081	20.559
$\frac{5}{8}$	20.188	20.453	20.719	21.250	21.781	22.313	22.844
$\frac{11}{16}$	22.206	22.498	22.791	23.375	23.959	24.544	25.128
$\frac{3}{4}$	24.225	24.544	24.863	25.500	26.138	26.775	27.413
$\frac{13}{16}$	26.244	26.589	26.934	27.625	28.316	29.006	29.697
$\frac{7}{8}$	28.263	28.634	29.006	29.750	30.494	31.238	31.981
$\frac{15}{16}$	30.281	30.680	31.078	31.875	32.672	33.469	34.266
0	32.300	32.725	33.150	34.000	34.850	35.700	36.550
$\frac{1}{8}$	36.338	36.816	37.294	38.250	39.206	40.163	41.119
$\frac{1}{4}$	40.375	40.906	41.438	42.500	43.563	44.625	45.688
$\frac{3}{8}$	44.413	44.997	45.581	46.750	47.919	49.088	50.256
$\frac{1}{2}$	48.450	49.088	49.725	51.000	52.275	53.550	54.825
$\frac{5}{8}$	52.488	53.178	53.869	55.250	56.631	58.013	59.394
$\frac{3}{4}$	56.525	57.269	58.013	59.500	60.988	62.475	63.963
$\frac{7}{8}$	60.563	61.359	62.156	63.750	65.344	66.938	68.531
0	64.600	65.450	66.300	68.000	69.700	71.400	73.100
$\frac{1}{8}$	68.638	69.541	70.444	72.250	74.056	75.863	77.669
$\frac{1}{4}$	72.675	73.631	74.588	76.500	78.413	80.325	82.238

For HIGH SPEED STEEL add 10 per cent.

FLAT BAR STEEL **WEIGHT PER LINEAR FOOT, POUNDS**

Thick- ness, Inches	WIDTH, INCHES				
	11	11¼	11½	11¾	12
1/32	1.169	1.195	1.222	1.248	1.275
1/16	2.338	2.391	2.444	2.497	2.550
3/32	3.506	3.586	3.666	3.745	3.825
1/8	4.675	4.781	4.888	4.994	5.100
5/32	5.844	5.977	6.109	6.242	6.375
3/16	7.013	7.172	7.331	7.491	7.650
7/32	8.181	8.367	8.553	8.739	8.925
1/4	9.350	9.563	9.775	9.988	10.200
5/16	11.688	11.953	12.219	12.484	12.750
3/8	14.025	14.344	14.663	14.981	15.300
7/16	16.363	16.734	17.106	17.478	17.850
1/2	18.700	19.125	19.550	19.975	20.400
9/16	21.038	21.516	21.994	22.472	22.950
5/8	23.375	23.906	24.438	24.969	25.500
11/16	25.713	26.297	26.881	27.466	28.050
3/4	28.050	28.688	29.325	29.963	30.600
13/16	30.388	31.078	31.769	32.459	33.150
7/8	32.725	33.469	34.213	34.956	35.700
15/16	35.063	35.859	36.656	37.453	38.250
0	37.400	38.250	39.100	39.950	40.800
1/8	42.075	43.031	43.988	44.944	45.900
1/4	46.750	47.813	48.875	49.938	51.000
3/8	51.425	52.594	53.763	54.931	56.100
1/2	56.100	57.375	58.650	59.925	61.200
5/8	60.775	62.156	63.538	64.919	66.300
3/4	65.450	66.938	68.425	69.913	71.400
7/8	70.125	71.719	73.313	74.906	76.500
0	74.800	76.500	78.200	79.900	81.600
2 1/8	79.475	81.281	83.088	84.894	86.700
1/4	84.150	86.063	87.975	89.888	91.800

For HIGH SPEED STEEL add 10 per cent.

TABLE OF TEMPER COLORS OF CARBON STEEL COMMONLY ACCEPTED AS STANDARD

	Woodworth °F.	Haswell °F.	Haswell °C.
Very Light Yellow.....	420	...	...
Faint Yellow.....	430	430	221
Straw Color.....	460	460	238
Dark Straw.....	470	470	243
Dark Yellow.....	490	...	255
Brown Yellow.....	500	...	260
Spotted Red Brown.....	510	...	265
Purple.....	530	530	277
Blue.....	550	550	289
Full Blue.....	560	560	293
Polish Blue.....	580	580	304
Dark Blue.....	600	600	316

INCANDESCENT COLORS AND TEMPERATURES

TAYLOR & WHITE'S TABLE

	Degrees	
	F.	C.
Black Red.....	990	532
Dark Blood Red.....	1050	566
Dark Cherry Red.....	1175	635
Medium Cherry Red.....	1250	677
Full Cherry Red.....	1375	746
Light Cherry, Scaling.....	1550	843
Salmon, Free Scaling.....	1650	899
Light Salmon.....	1725	941
Yellow.....	1825	996
Light Yellow.....	1975	1079
White.....	2220	1216

TEMPERATURES

DEGREES FAHRENHEIT AND CORRESPONDING CENTIGRADE

F.	C.	F.	C.	F.	C.
32	0	1060	571	1760	960
212	100	1080	582	1780	971
400	204	1100	593	1800	982
420	216	1120	604	1820	993
440	227	1140	615	1840	1004
460	238	1160	626	1860	1015
480	249	1180	637	1880	1026
500	260	1200	648	1900	1038
520	271	1220	659	1920	1049
540	282	1240	670	1940	1060
560	293	1260	681	1960	1071
580	305	1280	693	1980	1082
600	316	1300	705	2000	1093
620	327	1320	716	2020	1105
640	338	1340	727	2040	1116
660	349	1360	738	2060	1127
680	360	1380	749	2080	1138
700	371	1400	760	2100	1149
720	382	1420	771	2120	1160
740	393	1440	782	2140	1171
760	405	1460	793	2160	1182
780	416	1480	804	2180	1193
800	427	1500	816	2200	1204
820	438	1520	827	2220	1216
840	449	1540	838	2240	1227
860	460	1560	849	2260	1238
880	471	1580	860	2280	1249
900	482	1600	871	2300	1260
920	493	1620	882	2320	1271
940	504	1640	893	2340	1283
960	516	1660	904	2360	1294
980	527	1680	915	2380	1305
1000	538	1700	927	2400	1316
1020	549	1720	938	2420	1327
1040	560	1740	949	2440	1338

TEMPERATURES

DEGREES CENTIGRADE AND CORRESPONDING FAHRENHEIT

C.	F.	C.	F.	C.	F.
0	32	530	986	880	1616
100	212	540	1004	890	1634
200	392	550	1022	900	1652
210	410	560	1040	910	1670
220	428	570	1058	920	1688
230	446	580	1076	930	1706
240	464	590	1094	940	1724
250	482	600	1112	950	1742
260	500	610	1130	960	1760
270	518	620	1148	970	1778
280	536	630	1166	980	1796
290	554	640	1184	990	1814
300	572	650	1202	1000	1832
310	590	660	1220	1010	1850
320	608	670	1238	1020	1868
330	626	680	1256	1030	1886
340	644	690	1274	1040	1904
350	662	700	1292	1050	1922
360	680	710	1310	1060	1940
370	698	720	1328	1070	1958
380	716	730	1346	1080	1976
390	734	740	1364	1090	1994
400	752	750	1382	1100	2012
410	770	760	1400	1110	2030
420	788	770	1418	1120	2048
430	806	780	1436	1130	2066
440	824	790	1454	1140	2084
450	842	800	1472	1150	2102
460	860	810	1490	1160	2120
470	878	820	1508	1170	2138
480	896	830	1526	1180	2156
490	914	840	1544	1190	2174
500	932	850	1562	1200	2192
510	950	860	1580	1210	2210
520	968	870	1598	1220	2228

**TABLE OF
BRINELL HARDNESS NUMBERS
STEEL BALL OF 10 MM. DIAMETER**

Diam. of Impression, mm.	HARDNESS NUMBERS		Diam. of Impression, mm.	HARDNESS NUMBERS	
	At 3000 Kg., Pressure	At 500 Kg., Pressure		At 3000 Kg., Pressure	At 500 Kg., Pressure
2.00	945	158	3.25	352	58.6
2.05	899	150	3.30	341	56.8
2.10	856	143	3.35	331	55.1
2.15	817	136	3.40	321	53.4
2.20	780	130	3.45	311	51.8
2.25	745	124	3.50	302	50.3
2.30	712	119	3.55	293	48.9
2.35	682	114	3.60	285	47.5
2.40	653	109	3.65	277	46.1
2.45	627	104	3.70	269	44.9
2.50	601	100	3.75	262	43.6
2.55	578	96.3	3.80	255	42.4
2.60	555	92.6	3.85	248	41.3
2.65	534	89.0	3.90	241	40.2
2.70	514	85.7	3.95	235	39.1
2.75	495	82.6	4.00	229	38.1
2.80	477	79.6	4.05	223	37.1
2.85	461	76.8	4.10	217	36.2
2.90	444	74.1	4.15	212	35.3
2.95	429	71.5	4.20	207	34.4
3.00	415	69.1	4.25	201	33.6
3.05	401	66.8	4.30	197	32.8
3.10	388	64.6	4.35	192	32.0
3.15	375	62.5	4.40	187	31.2
3.20	363	60.5	4.45	183	30.5

**TABLE OF
BRINELL HARDNESS NUMBERS
STEEL BALL OF 10 MM. DIAMETER—Continued**

Diam. of Impression, mm.	HARDNESS NUMBERS		Diam. of Impression, mm.	HARDNESS NUMBERS	
	At 3000 Kg., Pressure	At 500 Kg., Pressure		At 3000 Kg., Pressure	At 500 Kg., Pressure
4.50	179	29.8	5.75	105	17.5
4.55	174	29.1	5.80	103	17.2
4.60	170	28.4	5.85	101	16.8
4.65	167	27.8	5.90	99.2	16.5
4.70	163	27.1	5.95	97.3	16.2
4.75	159	26.5	6.00	95.5	15.9
4.80	156	25.9	6.05	93.7	15.6
4.85	152	25.4	6.10	92.0	15.3
4.90	149	24.8	6.15	90.3	15.1
4.95	146	24.3	6.20	88.7	14.8
5.00	143	23.8	6.25	87.1	14.5
5.05	140	23.3	6.30	85.5	14.2
5.10	137	22.8	6.35	84.0	14.0
5.15	134	22.3	6.40	82.5	13.7
5.20	131	21.8	6.45	81.0	13.5
5.25	128	21.4	6.50	79.6	13.3
5.30	126	20.9	6.55	78.2	13.0
5.35	123	20.5	6.60	76.8	12.8
5.40	121	20.1	6.65	75.4	12.6
5.45	118	19.7	6.70	74.1	12.4
5.50	116	19.3	6.75	72.8	12.1
5.55	114	18.9	6.80	71.6	11.9
5.60	111	18.6	6.85	70.4	11.7
5.65	109	18.2	6.90	69.1	11.5
5.70	107	17.8	6.95	68.0	11.3

NUMBER OF REVOLUTIONS REQUIRED TO OBTAIN
SURFACE SPEEDS OF FROM 20 FEET TO 35 FEET PER
MINUTE ON DIAMETERS FROM 1 INCH TO 40 INCHES

Diam., Inches	Circum., Inches	Circum., Feet	SURFACE SPEEDS PER MINUTE			
			20 Feet	25 Feet	30 Feet	35 Feet
1	3.1416	0.261	76.397	95.493	114.590	133.690
2	6.2832	0.523	38.197	47.746	57.296	66.845
3	9.4248	0.785	25.465	31.831	38.197	44.563
4	12.5664	1.047	19.099	23.873	28.647	33.422
5	15.7080	1.309	15.279	19.098	22.918	26.738
6	18.850	1.570	12.732	15.915	19.098	22.281
7	21.991	1.832	11.167	13.641	16.370	19.098
8	25.133	2.094	9.55	11.936	14.324	16.711
9	28.274	2.356	8.49	10.610	12.732	14.854
10	31.416	2.618	7.64	9.55	11.459	13.369
11	34.558	2.879	6.94	8.68	10.417	12.100
12	37.699	3.141	6.37	7.96	9.55	11.083
13	40.841	3.403	5.88	7.35	8.81	10.283
14	43.982	3.665	5.47	6.82	8.19	9.55
15	47.124	3.927	5.09	6.37	7.64	8.91
16	50.265	4.188	4.77	5.97	7.16	8.36
17	53.407	4.450	4.49	5.62	6.74	7.86
18	56.549	4.712	4.24	5.31	6.36	7.43
19	59.690	4.974	4.02	4.91	6.03	7.04
20	62.832	5.236	3.82	4.77	5.73	6.68
21	65.973	5.497	3.64	4.55	5.46	6.37
22	69.115	5.759	3.47	4.34	5.21	6.08
23	72.257	6.021	3.32	4.15	4.98	5.81
24	75.398	6.283	3.18	3.98	4.77	5.57
25	78.540	6.545	3.06	3.82	4.58	5.35
26	81.681	6.806	2.94	3.67	4.41	5.14
27	84.823	7.068	2.83	3.53	4.34	4.95
28	87.965	7.330	2.73	3.41	4.09	4.77
29	91.106	7.592	2.63	3.29	3.94	4.61
30	94.248	7.854	2.55	3.18	3.82	4.46
31	97.389	8.115	2.46	3.08	3.69	4.31
32	100.53	8.377	2.39	2.98	3.58	4.18
33	103.67	8.639	2.32	2.89	3.47	4.05
34	106.81	8.901	2.25	2.81	3.37	3.93
35	109.96	9.163	2.18	2.73	3.27	3.82
36	113.10	9.425	2.12	2.65	3.18	3.71
37	116.24	9.686	2.06	2.58	3.09	3.61
38	119.38	9.948	2.01	2.51	3.02	3.52
39	122.52	10.210	1.96	2.45	2.94	3.43
40	125.66	10.472	1.91	2.39	2.86	3.34

NUMBER OF REVOLUTIONS REQUIRED TO OBTAIN
SURFACE SPEEDS OF FROM 40 FEET TO 60 FEET PER
MINUTE ON DIAMETERS FROM 1 INCH TO 40 INCHES

Diam., Inches	Circum., Inches	Circum., Feet	SURFACE SPEEDS PER MINUTE			
			40 Feet	45 Feet	50 Feet	60 Feet
1	3.1416	0.261	152.789	171.887	190.986	229.182
2	6.2832	0.523	76.394	85.944	95.493	114.590
3	9.4248	0.785	50.929	57.296	63.662	76.394
4	12.5664	1.047	38.197	42.971	47.746	57.296
5	15.7080	1.309	30.557	34.377	38.197	45.836
6	18.850	1.570	25.465	28.648	31.831	38.197
7	21.991	1.832	21.826	24.555	27.283	32.740
8	25.133	2.094	19.098	21.486	23.873	28.647
9	28.274	2.356	16.976	19.098	21.220	25.464
10	31.416	2.618	15.278	17.188	19.098	22.918
11	34.558	2.879	13.889	15.626	17.362	20.834
12	37.699	3.141	12.732	14.324	15.915	19.098
13	40.841	3.403	11.753	13.222	14.691	17.629
14	43.982	3.665	11.167	12.277	13.641	16.370
15	47.124	3.927	10.185	11.459	12.732	15.278
16	50.265	4.188	9.55	10.743	11.936	14.324
17	53.407	4.450	8.99	10.018	11.234	13.481
18	56.549	4.712	8.49	9.55	10.610	12.732
19	59.690	4.974	8.04	9.05	10.028	12.062
20	62.832	5.236	7.64	8.59	9.55	11.459
21	65.973	5.497	7.28	8.19	9.09	10.913
22	69.115	5.759	6.94	7.81	8.68	10.417
23	72.257	6.021	6.64	7.47	8.30	9.987
24	75.398	6.283	6.37	7.16	7.96	9.549
25	78.540	6.545	6.11	6.88	7.64	9.167
26	81.681	6.806	5.88	6.61	7.35	8.81
27	84.823	7.068	5.66	6.37	7.07	8.49
28	87.965	7.330	5.47	6.14	6.82	8.19
29	91.106	7.592	5.27	5.93	6.59	7.90
30	94.248	7.854	5.09	5.73	6.37	7.64
31	97.389	8.115	4.93	5.54	6.16	7.39
32	100.53	8.377	4.77	5.37	5.97	7.16
33	103.67	8.639	4.63	5.21	5.79	6.95
34	106.81	8.901	4.49	5.06	5.62	6.74
35	109.96	9.163	4.37	4.91	5.46	6.55
36	113.10	9.425	4.24	4.77	5.31	6.37
37	116.24	9.686	4.13	4.64	5.16	6.19
38	119.38	9.948	4.02	4.52	5.03	6.03
39	122.52	10.210	3.92	4.41	4.90	5.88
40	125.66	10.472	3.82	4.29	4.77	5.73

DECIMAL EQUIVALENTS OF FRACTIONS OF AN INCH

$\frac{1}{64}$	.015625	$\frac{33}{64}$	.515625
$\frac{1}{32}$	.03125	$\frac{17}{32}$	.53125
$\frac{3}{64}$	.046875	$\frac{35}{64}$	.546875
$\frac{1}{16}$	.0625	$\frac{9}{16}$	.5625
$\frac{5}{64}$	.078125	$\frac{37}{64}$	.578125
$\frac{3}{32}$	.09375	$\frac{19}{32}$	.59375
$\frac{7}{64}$	.109375	$\frac{39}{64}$	.609375
$\frac{1}{8}$	.125	$\frac{5}{8}$	.625
$\frac{9}{64}$	.140625	$\frac{41}{64}$	.640625
$\frac{5}{32}$	.15625	$\frac{21}{32}$	.65625
$\frac{11}{64}$	.171875	$\frac{43}{64}$	.671875
$\frac{3}{16}$	.1875	$\frac{11}{16}$	.6875
$\frac{13}{64}$	.203125	$\frac{45}{64}$	.703125
$\frac{7}{32}$	.21875	$\frac{23}{32}$	.71875
$\frac{15}{64}$	.234375	$\frac{47}{64}$	.734375
$\frac{1}{4}$	.25	$\frac{3}{4}$	.75
$\frac{17}{64}$	.265625	$\frac{49}{64}$	.765625
$\frac{9}{32}$	.28125	$\frac{25}{32}$	.78125
$\frac{19}{64}$	.296875	$\frac{51}{64}$	.796875
$\frac{5}{16}$	.3125	$\frac{13}{16}$	.8125
$\frac{21}{64}$	.328125	$\frac{53}{64}$	.828125
$\frac{11}{32}$	.34375	$\frac{27}{32}$	.84375
$\frac{23}{64}$	.359375	$\frac{55}{64}$	.859375
$\frac{3}{8}$	.375	$\frac{7}{8}$	.875
$\frac{25}{64}$	.390625	$\frac{57}{64}$	.890625
$\frac{13}{32}$	.40625	$\frac{29}{32}$	.90625
$\frac{27}{64}$	.421875	$\frac{59}{64}$	.921875
$\frac{7}{16}$	.4375	$\frac{15}{16}$	.9375
$\frac{29}{64}$	.453125	$\frac{61}{64}$	.953125
$\frac{15}{32}$	.46875	$\frac{31}{32}$	.96875
$\frac{31}{64}$	.484375	$\frac{63}{64}$	.984375
$\frac{1}{2}$	.50	1.....	1.000

INDEX

	PAGE		PAGE
Alloy Tool Steels		Bethlehem Tool Steel (Cont'd)	
Bethlehem.....	31-39	Corrosion Resisting Steels	
Bethlehem No. 71.....	34-35	No. 2 and No. 3.....	50
Instructions for Working..	34	Special High Chromium	
Annealing.....	34	Steels.....	51
Forging.....	34	Stainless Steel—Type A..	50
Hardening and Temper-		Stainless Steel—Type C..	49
ing.....	35	Drill Steels (Rock and	
Uses.....	34	Mining).....	27-30
Lehigh Die and Tool Steel..	37-39	Extra Special High Speed	
Annealing.....	39	Tool Steel.....	15
Forging.....	38	Hardening and Tempering	15
Hardening, Tempering..	38	Uses.....	15
Uses.....	37	Finishing Tool Steel.....	18
Tool Room Oil Hardening		Hardening and Tempering	18
Tool Steel.....	32-33	Uses.....	18
Hardening.....	33	Lehigh Die and Tool Steel..	37-39
Tempering.....	33	Annealing.....	39
Uses.....	32	Forging.....	38
Tough Tool Steel.....	36	Hardening.....	38
Hardening and Temper-		Tempering.....	38
ing.....	36	Uses.....	37
Uses.....	36	Mining, Quarrying and Stone	
Bethlehem Special.....	41-51	Working Tool Steels.....	30
Angles (Tool Clearance and Cut-		No. 71 Alloy Tool Steel..	34-35
ting).....	12	Instructions for Working	34
Annealing		Annealing.....	34
Bethlehem Tool Steels.....	63	Forging.....	34
High Speed Tool Steel.....	11	Hardening, Tempering..	35
Lehigh Die and Tool Steel..	39	Uses.....	34
No. 71 Alloy Tool Steel.....	34	No. 57 Hot Work Tool Steel	45-46
No. 57 Hot Work Tool Steel..	46	Annealing.....	46
No. 445 Hot Work Tool Steel	47	Hardening.....	45
		Tempering.....	45
		Uses.....	45
		No. 445 Hot Work Tool Steel	47
		Annealing.....	47
		Hardening.....	47
		Tempering.....	47
		Uses.....	47
		No. 6 Nickel Steel.....	48
		No. 1 Permanent Magnet	
		Steel.....	44
		Uses.....	44
Ball Race Steels, Bethlehem			
Chrome.....	43		
Bark, Annealing.....	11		
Bethlehem Tool Steels			
Alloy Tool Steels.....	31-39		
Carbon Tool Steels.....	19-25		
Chrome Ball Race Steels....	43		
Corrosion Resisting Steels..	49-51		
Uses.....	51		

	PAGE		PAGE
Bethlehem Tool Steels (Cont'd)		Carbon Tool Steels, Bethlehem	19-25
No. 2 Permanent Magnet Steel	44	Superior Tool Steel	22
Uses	44	X Tool Steel	25
Special Alloy Tool Steels	41-51	XCL Tool Steel	24
Special High Chromium Steels	51	XX Tool Steel	23
Special High Speed Tool Steel	8-13	XXX Tool Steel	21
Instructions for Working	9	Centigrade, Degrees and Corresponding Fahrenheit	97
Annealing	11	Class of Extras to Apply to Bethlehem Tool Steels	57
Forging	9	Classification of Extras, Standard	58-61
Grinding	10	Bethlehem Carbon Tool Steels	58-59
Hardening	9	Bethlehem Special High Speed Tool Steel	60-61
Uses	8	Colors	
Special High Speed Steel Bits for Tool Holders	17	Incandescent, and Temperatures	95
Stainless Steel, Type A	50	Temper, of Carbon Steel	95
Stainless Steel, Type C	49	Corrosion Resisting Steels	49-51
Superior Hollow Drill Steel	28	No. 2 and No. 3	50
Extras for Lengths	28	Cutting Extras	
Superior Tool Steel	22	Carbon Tool Steels	58
Hardening and Tempering	22	Special High Speed Tool Steel	60
Uses	22		
Tool Room Oil Hardening Tool Steel	32-33		
Hardening	33		
Harden and Anneals Uniformly	32		
Non-Warping and Non-Shrinking	32		
Tempering	33		
Uses	32		
Tough Tool Steel	36		
Hardening and Tempering	36		
Uses	36		
X Tool Steel	25		
Hardening and Tempering	25		
Uses	25		
XCL Tool Steel	24		
Hardening and Tempering	24		
Uses	24		
XX Tool Steel	23		
Hardening and Tempering	23		
Uses	23		
XXX Special Tool Steel	21		
Hardening and Tempering	21		
Uses	21		
Tool Steel Brand Names	57		
Bits, Tool Holder	17		
Brinell Hardness Numbers			
Table	98-99		
		Decimal Equivalents of Fractions of an Inch	102
		Degrees	
		Centigrade	97
		Fahrenheit	96
		Die Block Extras	
		Carbon Tool Steels	59
		Special High Speed Tool Steel	61
		Die Shapes, Nail	43
		Discs, Tool Steel, Weight of	54
		Drill Steels	
		Bethlehem Superior Hollow	28
		Extras for Lengths	28
		Rock and Mining	27-30
		Equivalents, Decimal, of Fractions of an Inch	102
		Extras	
		Bethlehem Carbon Tool Steels, Standard Classification of	58-59

	PAGE
Extras (Continued)	
Bethlehem Special High Speed Tool Steel, Standard Classification of, . . .	60-61
Bethlehem Superior Hollow Drill Steel.	61
Carbon Tool Steel Discs and Die Blocks.	59
Special High Speed Tool Steel Discs and Die Blocks.	61
to Apply to Bethlehem Tool Steels, Class of.	57
Extra Special High Speed Tool Steel.	15
Hardening and Tempering. . .	15
Uses.	15

Fahrenheit, Degrees and Corresponding Centigrade. . .	96
Finishing Tool Steel, Bethlehem	18
Hardening and Tempering. .	18
Uses.	18

Flat Bar Steel, Weight Per Linear Foot.	75-94
Foreword.	3

Forging	
Bethlehem Tool Steels.	62
Lehigh Die and Tool Steel. .	38
No. 71 Alloy Tool Steel. . . .	34
Special High Speed Tool Steel	9

Grinding	
Bethlehem Tool Steels.	63
Special High Speed Tool Steel	10

Hardening	
Bethlehem Tool Steels.	62
Lehigh Die and Tool Steel. .	38
No. 71 Alloy Tool Steel. . . .	35
No. 57 Hot Work Tool Steel. .	45
No. 445 Hot Work Tool Steel	47

	PAGE
Hardening (Continued)	
Oil Hardening Tool Steel. . . .	33
Special High Speed Tool Steel	9
Hardness Numbers, Table of Brinell.	98-99
Hexagon Bar Steel, Weight per Linear Foot.	74
High Speed Tool Steel, Bethlehem Special.	8-13
Instructions for Working. . . .	9
Annealing.	11
Forging.	9
Grinding.	10
Hardening.	9
Uses.	8
High Speed Steel Bits for Tool Holders, Bethlehem Special. .	17
Hollow Drill Steel, Bethlehem Superior.	28
Extras for Lengths.	28
Hot Work Tool Steel, Bethlehem No. 57.	45-46
Annealing.	46
Hardening.	45
Tempering.	45
Uses.	45
Hot Work Tool Steel, Bethlehem No. 445.	47
Annealing.	47
Hardening.	47
Tempering.	47
Uses.	47

Incandescent Colors and Temperatures.	95
---	----

Instructions for Working	
Bethlehem Tool Steels.	62-63
Annealing.	63
Forging.	62
Grinding.	63
Special High Speed Tool Steel.	9-12
Annealing.	11
Forging.	9
Grinding.	10
Hardening.	9

	PAGE
L ehigh Die and Tool Steel..	37-39
Annealing.....	39
Forging.....	38
Hardening and Tempering..	38
Uses.....	37

M agnet Steel	
Bethlehem No. 1 Permanent	44
Uses.....	44
Bethlehem No. 2 Permanent	44
Uses.....	44

Mining, Quarrying and Stone Working Tool Steels, Beth- lehem.....	30
---	----

N ail Die Shapes.....	43
Nickel Steel	
Bethlehem No. 6.....	48

Non-Warping and Non-Shrink- ing Property of Bethlehem Tool Room Oil Hardening Tool Steel.....	32
--	----

No. 71 Alloy Tool Steel, Beth- lehem.....	34-35
Instructions for Working..	34-35
Annealing.....	34
Forging.....	34
Hardening and Tempering	35
Uses.....	34

O ctagon Bar Steel, Weight per Linear Foot.....	74
Offices, Sales.....	108
Oil Hardening Tool Steel, Bethlehem Tool Room..	32-33
Hardening.....	33
Hardens and Anneals Uni- formly.....	32
Non-Warping and Non- Shrinking.....	32
Tempering.....	33
Uses.....	32

	PAGE
P ermanent Magnet Steel	
Bethlehem No. 1.....	44
Uses.....	44
Bethlehem No. 2.....	44
Uses.....	44

Quarrying, Mining and Stone Working Tool Steels, Beth- lehem.....	30
---	----

R evolutions per Minute to Obtain Certain Speeds..	100-101
Round Bar Steel, Weight per Linear Foot.....	70-71
Round Nose Turning Tools....	12
Round Steel, Weight per Linear Inch.....	66-69

Sales Offices.....	108
Special Alloy Steels, Beth- lehem.....	41-51
Special High Chromium Steels..	51
Special High Speed Steel Bits for Tool Holders.....	17
Special High Speed Tool Steel, Bethlehem.....	8-13
Instructions for Working....	9
Annealing.....	11
Forging.....	9
Grinding.....	10
Hardening.....	9
Uses.....	8

Special Tool Steel, Bethlehem XXX.....	21
Hardening and Tempering..	21
Uses.....	21
Speeds in "Feet" per Minute	100-101
Square Bar Steel, Weight per Linear Foot.....	72-73
Standard Classification of Extras.....	58-61
Bethlehem Carbon Tool Steels.....	58-59

	PAGE
Standard Classification of Extras (Continued)	
Bethlehem Special High	
Speed Tool Steel.....	60-61
Stainless Steel—Type A.....	50
Stainless Steel—Type C.....	49
Steel Discs, Weight of Tool....	54
Stone Working, Mining and	
Quarrying Tool Steels,	
Bethlehem.....	30
Superior Hollow Drill Steel,	
Bethlehem.....	28
Extras for Lengths.....	28
Superior Tool Steel, Bethlehem..	22
Hardening and Tempering..	22
Uses.....	22
 Table of Brinell Hardness	
Numbers.....	98-99
Temper Colors of Carbon Steel..	95
Temperatures.....	
Centigrade and Fahrenheit	
Conversion Tables.....	96-97
Incandescent Colors and....	95
Tempering.....	
Bethlehem Tool Room Oil	
Hardening Tool Steel....	33
Bethlehem Lehigh Die and	
Tool Steel.....	38
Bethlehem No. 57 Hot Work	
Tool Steel.....	45
Bethlehem No. 445 Hot Work	
Tool Steel.....	47
Toolholder Bits.....	17
Tool Room Oil Hardening	
Tool Steel, Bethlehem.....	32-33
Hardening.....	33
Hardens and Anneals Uni-	
formly.....	32

	PAGE
Tool Room Oil Hardening Tool	
Steel (Continued)	
Non-Warping and Non-	
Shrinking.....	32
Tempering.....	33
Uses.....	32
Tool Steel Discs, Weight of....	54
Tough Tool Steel, Bethlehem...	36
Hardening and Tempering...	36
Uses.....	36
Turning Tools, Round Nose....	12
 Warehouses.....	108
Warranty.....	56
Weight per Linear Foot of	
Bar Steel.....	70-94
Flat.....	75-94
Hexagon.....	74
Octagon.....	74
Round.....	70-71
Square.....	72-73
Weight of Tool Steel Discs....	54
Weight per Linear Inch of	
Round Steel.....	66-69
 X Tool Steel, Bethlehem.....	25
Hardening and Tempering...	25
Uses.....	25
XCL Tool Steel, Bethlehem....	24
Hardening and Tempering...	24
Uses.....	24
XX Tool Steel, Bethlehem.....	23
Hardening and Tempering...	23
Uses.....	23
XXX Special Tool Steel, Beth-	
lehem.....	21
Hardening and Tempering...	21
Uses.....	21

BETHLEHEM STEEL COMPANY

General Offices

BETHLEHEM, PENNSYLVANIA

District Offices

Atlanta	Healey Building
Boston	Atlantic National Bank Building
Baltimore	Continental Building
Buffalo	Marine Trust Building
Chicago	People's Gas Building
Cincinnati	Union Trust Building
Cleveland	Union Trust Building
Detroit	Penobscot Building
Honolulu, T. H.	Castle and Cook Building
Los Angeles	Pacific Finance Building
New York	Cunard Building
Philadelphia	Widener Building
Pittsburgh	Oliver Building
Portland, Ore.	American Bank Building
St. Louis	Arcade Building
San Francisco	Matson Building
Seattle	L. C. Smith Building
Washington, D. C.	Wilkins Building

Warehouses

BETHLEHEM, PA.	CLEVELAND, OHIO
BOSTON, MASS.	CHICAGO, ILL.

Bethlehem Steel Export Corporation

25 Broadway, New York City

Sole Exporter of Our Commercial Products

